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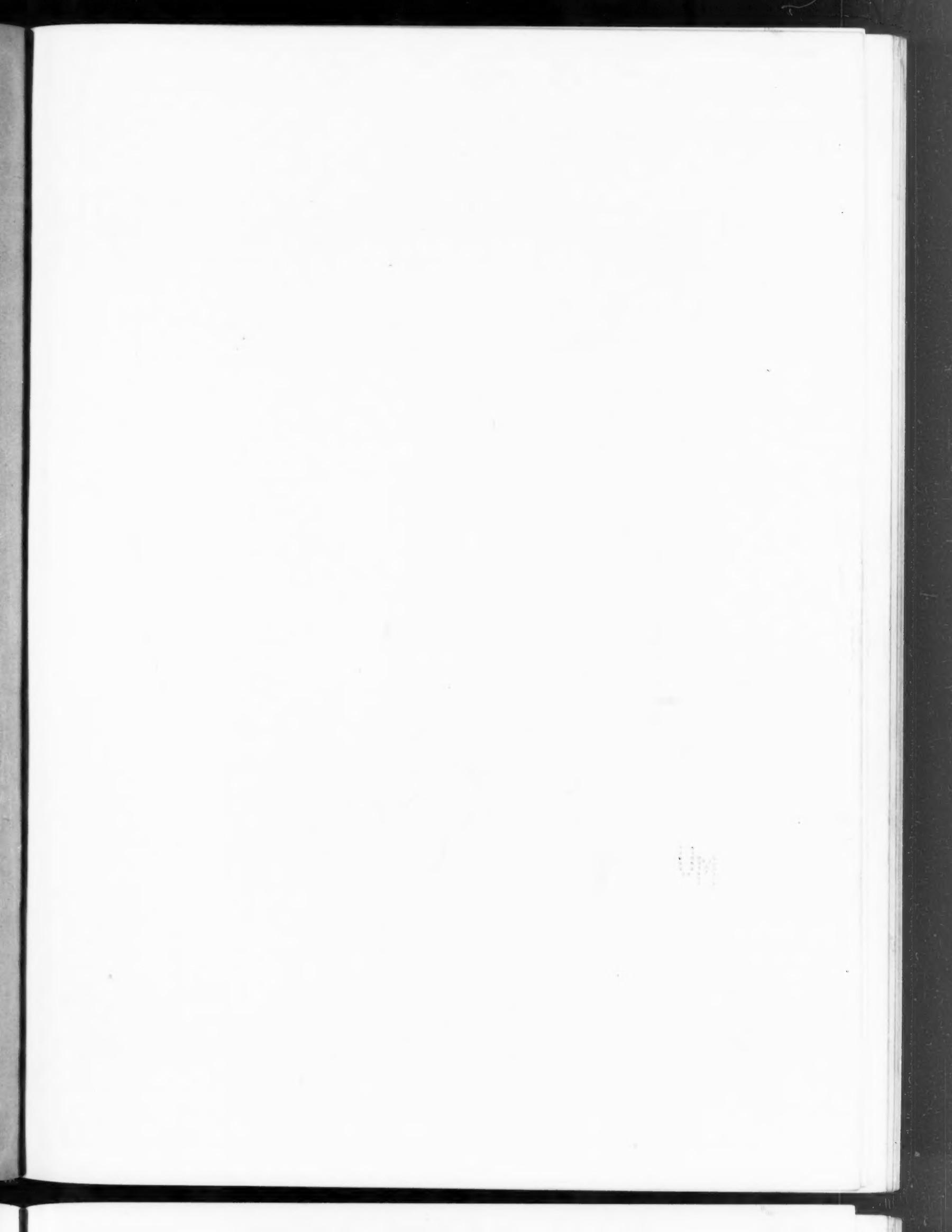
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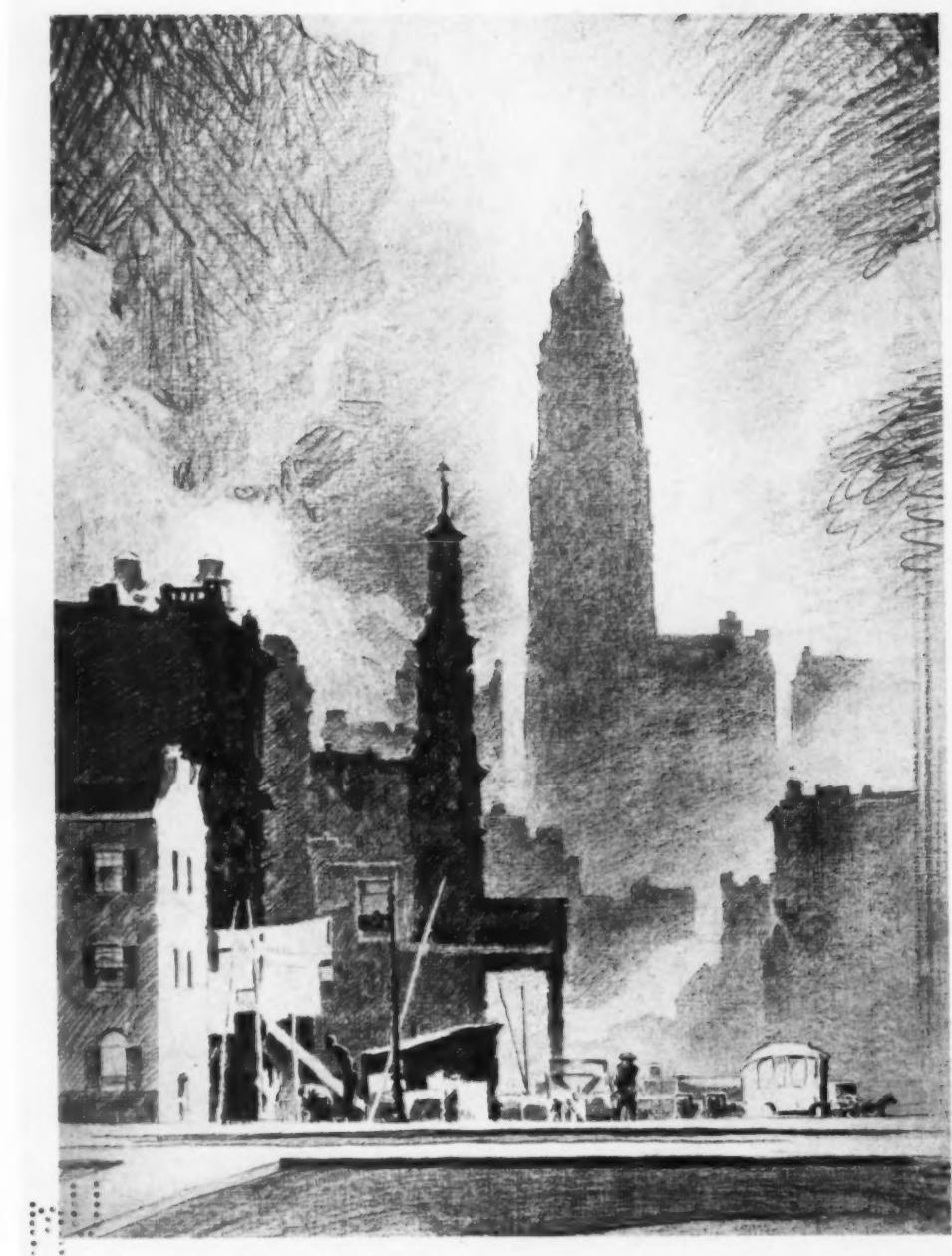
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The Decorative Function of the Stone Pavement

By HAROLD DONALDSON EBERLEIN

THE art of imparting decorative interest to stone pavements has been successfully practiced under manifold forms for thousands of years. Through the centuries it has been recognized as entitled to play a part in the architect's scheme, and has been counted upon to contribute a specific and essential value in the entirety of the composition, a value not attainable by any other means. It has been freely employed with striking effect both within buildings and in the open, and its manifestations have been marvelously varied and not confined to use with any one mode of architectural expression.

It was left, however, for the mid-nineteenth century, with its sorry worship of merely mechanical production, to allow this rich and time honored art either to lapse into oblivion or else to fall into a plight of such stupid banality that its claims to serious consideration as a valuable accessory to architecture have been almost totally discredited.

It is quite true that of recent years, in the designing of public buildings, an increasing degree of attention has been paid the claims of the stone pavement as a decorative factor. But, unfortunately, the heritage of nineteenth century purblindness is still too potent for us to cast off altogether its blighting spell and most of us but dimly grasp the paving glories of the past—glories that we can again emulate and make fully ours if we will.

As the art of mosaic paving has been more generally understood and more continuously practiced than other modes of stone flooring, even during the period of nineteenth century dullness, attention will here be centered rather upon several less familiar types of embellishment for stone pavements, especially one method of inlay that was used from the twelfth, or possibly the eleventh, to the sixteenth century, and another that developed to its greatest perfection from the latter part of the sixteenth century to the early part of the eighteenth. In considering all these forms of paving enrichment it should be borne in mind that they are not, through any inherent qualities, restricted to use in large or public buildings. They may be laid with quite as much propriety in private houses of aver-

age size, if one wishes to have them. So far as fitness is concerned, the only factors to be considered are the particular sort of decorated paving to be chosen, and the design, this being held to include both pattern and color.

The various sorts of decorated stone paving, technically classified, are these:

(1) *Opus tessellatum*, consisting of small marble or stone cubes or *tesseræ* about $\frac{3}{4}$ inch square, sawn or worked by hand to a proper shape and regularly disposed in simple geometrical patterns; the same *tesseræ* were likewise used in other sorts of mosaic, but the pavement was not called *tessellatum* unless the component units were exclusively of this square shape;

(2) *Opus vermiculatum*, consisting of *tesseræ* of irregular shapes and sizes, varying from $\frac{1}{2}$ inch to $\frac{1}{20}$ inch, the pieces being individually adapted to their positions so as to follow the lines of the design, which was usually of a pictorial character; in the background, or in large masses of even coloring, these divisions caused an appearance like a mass of worms, hence the name;

(3) *Opus sectile*, so called from the *secta* or separate units, cut out from colored marbles or stone, and really a species of stone marquetry devised to produce both pattern and color;

(4) *Opus Alexandrinum*, a special variety or subdivision of *opus sectile*, in which the units were cut into triangles, squares, oblongs, rhomboids, hexagons and the like, and so combined as to compose regular geometrical patterns—geometrical *opus sectile*, in other words.

Of the foregoing modes, *opus tessellatum* and *opus vermiculatum* both fall in the category of "mosaic pavement" as we commonly understand that term. Whence the Greeks derived their first inspiration for this manner of flooring is a disputed point. At all events, the Romans learned it from the Greeks and elaborated it to the highest stage of perfection.

In the form to which the Romans advanced it, it has supplied the point of departure whence all subsequent phases of decorated stone paving have branched off. The technical processes involved are

given by Vitruvius and Vasari, and may easily be found elsewhere, so that there is no need to dwell upon them here.

Opus sectile made its appearance at an early date and ultimately reached several totally divers forms of development. One of these, *opus Alexandrinum*, common throughout Italy and the East, and occurring to some extent elsewhere also, reached its highest perfection in the thirteenth century. It consists in part of small marble *tesserae*, which often compose the main lines of the pattern and in part of large pieces of stone or colored marble used as a ground or matrix. It is frequently designed in large flowing bands which interlace and enclose circles of varied sizes. The circles of colored stone so enclosed are sometimes cross sections sliced from a column. In conjunction with the interlacing circle motifs are often to be found oblongs, hexagons or roundels, defined by bands of white marble and filled with a diaper pattern composed of small, geometrically shaped pieces of vari-colored stones or marbles. The materials chiefly used for this paving were



Fig. 1. The Emperor Sigismund, Cathedral of Siena

white marble, with green and red porphyry, while occasionally minute pieces of gold glass were introduced by way of additional enrichment. Instead of small white marble *tesserae*, larger pieces of white marble were often used to form the interlacing bands. Paving of this type is sometimes styled "cosmatic," but the term "cosmatic work" is, perhaps, more applicable to a very similar sort of decoration with smaller details on a vertical surface.

Santa Maria in Cosmedin (Fig. 2) and San Clemente in Rome afford admirable examples of such decorated paving as has just been described, while in England worthy specimens are to be seen in Westminster Abbey in the Chapel of Edward the Confessor and in the sacra-rium before the high altar, laid about 1268 by one Odericus, a Roman artist brought by Abbot Ware on his return from a visit to Rome. *Opus Alexandrinum* attained its most elaborate, and in some respects most effective, expression in the paving of San Marco in Venice, where not only the usual methods were used but where also, in many places,



Fig. 2. *Opus Alexandrinum*, Floor of Santa Maria in Cosmedin, Rome

a wider range of materials was employed, with a greater diversity of patterns, and where a certain appearance of incipient perspective was sometimes compassed through the use of shaded marbles.

However engaging may be the study of *opus Alexandrinum* and the two phases of mosaic already alluded to, there are two sorts of *opus sectile* quite apart from *opus Alexandrinum* that just now more claim our attention because they are less known or, at any rate, have hitherto had less consideration. One made its appearance at the beginning of the thirteenth century,—or possibly in the latter part of the twelfth,—was employed with great effect in Italy and France, reached its full development in the ensuing centuries and maintained its ascendancy in unabated vigor until the end of the fifteenth century when it achieved its most notable triumph and embodiment, as a highly organized and complex mode of decorative paving, in the Cathedral of Siena. The other phase of *opus sectile*, after an obscure preliminary period of evolution, blossomed forth in the sixteenth century, was employed with brilliant results by the great baroque masters of the sixteenth and seventeenth centuries, and continued to hold its own until well into the eighteenth.

Of the first mentioned phase of *opus sectile*, admirable early examples exist in both Italy and France. In Italy, not to cite more numerous instances, we may point to the floor of the Baptistry in Florence and to the floor of San Miniato. Both of these plainly exhibit the methods of ingenious cunning pursued by the craftsmen and the wealth of decorative enrichment that could be thus accomplished. The materials were few and readily attainable, and the technical processes comparatively simple; the success of the result depended wholly upon the manual skill and the fruitful invention of the artist. In France, among other remarkable specimens of this type of paving, the floor in the Cathedral of St. Omer may be counted as one of the best.

To lay this pavement the cement bed was prepared in the manner noted by Vasari and then the pieces of marble or stone were carefully set according to the pattern. Close examination of Fig. 7 will show, first, that a great number of small, diversely shaped pieces of stone and marble have



Fig. 3. Complete Scheme of Paving in Cathedral of Siena

been set in the cement, each piece separately cut and laid to form the sundry diaper patterns; second, that the broad dividing bands, with quatrefoil and lozenge repeats, are made from single large slabs or flags of marble, with the ground incised and then inlaid or encrusted with a substance of contrasting color to throw the pattern into relief.

In the latter instance the process was as follows: the pattern was traced or outlined upon the surface of the marble, then all the surfaces to be sunk—that is to say, all the portions not intended to form part of the white pattern—were lowered either with a chisel or with a trepanning drill, according to the extent and nature of the sinkage. The cavities were

then filled up flush with the top surface, either with lead or else with black or colored mastic or hard-setting stucco, and the whole dressed to an even surface. In some cases, where the sinkages were extensive enough or of convenient shape, they might be filled with an inlay of contrasting colored stone or marble. This latter operation, however, required the nicest cutting and adjustment and was not, as a rule, expedient nor, on an extended scale, would it have been practicable.

The working of the aforementioned processes is even more clearly shown, in some respects, in Fig. 8. In this bit of the San Miniato paving the dividing lines are strips of dark marble, while each of the white flags, conformably to a favorite usage of the time, contains a graven design complete in itself. In the Italian work either lead or black mastic was commonly used to fill the sinkages. Sometimes both were used interchangeably, as in the pavement of Santa Maria dei Miracoli in Venice. In the contemporary French work there was greater variety in the color of the mastic or stucco filling—black, red, brown, dark green and both light and dark blue. This diversity in mastic coloring was probably, in some measure, due to the comparative difficulty in obtaining the vari-colored stones and marbles which the Italian workmen had in plenty.

The gravings or sinkages in the marble slabs varied from mere line incisions to comparatively

broad expanses. The fill of lead or mastic, as the case might be, was then fixed. For a narrow line a V shaped incision sufficed, with the chisel or drill marks left rough, so that the fill might key to the marble. For a broad line or other space, if the fill was mastic, the sinkage had vertical sides or edges, \square , and the sunk surface was left rough. If the fill was lead, the marble was undercut, thus \triangle , to hold the metal firmly in place as the chisel or drill marks in the sinkage did not afford a sufficient key.

In the French work of the period two or more colored mastics were often used in conjunction. Thus, one of the engraved stones at St. Omer, which displays a knight on horseback with his shield, his spear and pennon, and an inscription surrounding the floriated background, shows a brown ground and brown-filled lettering, while the lines of the knight's figure, of the horse, and of the heraldic charges are red. The inscriptions on this and other stones indicate that each stone was the gift of an individual, and that the paving was provided in this way. In some of the paving laid at St. Denis, the mastics are black, red, dark green, gray-blue and brown within a limited compass. At Amiens also there is considerable variety of color. While the French generally preferred to confine one complete design to a single slab or flag, the ensemble produced when all these units were put together was mellow in color and rich in pattern.

As a masterpiece of cunning craftsmanship in

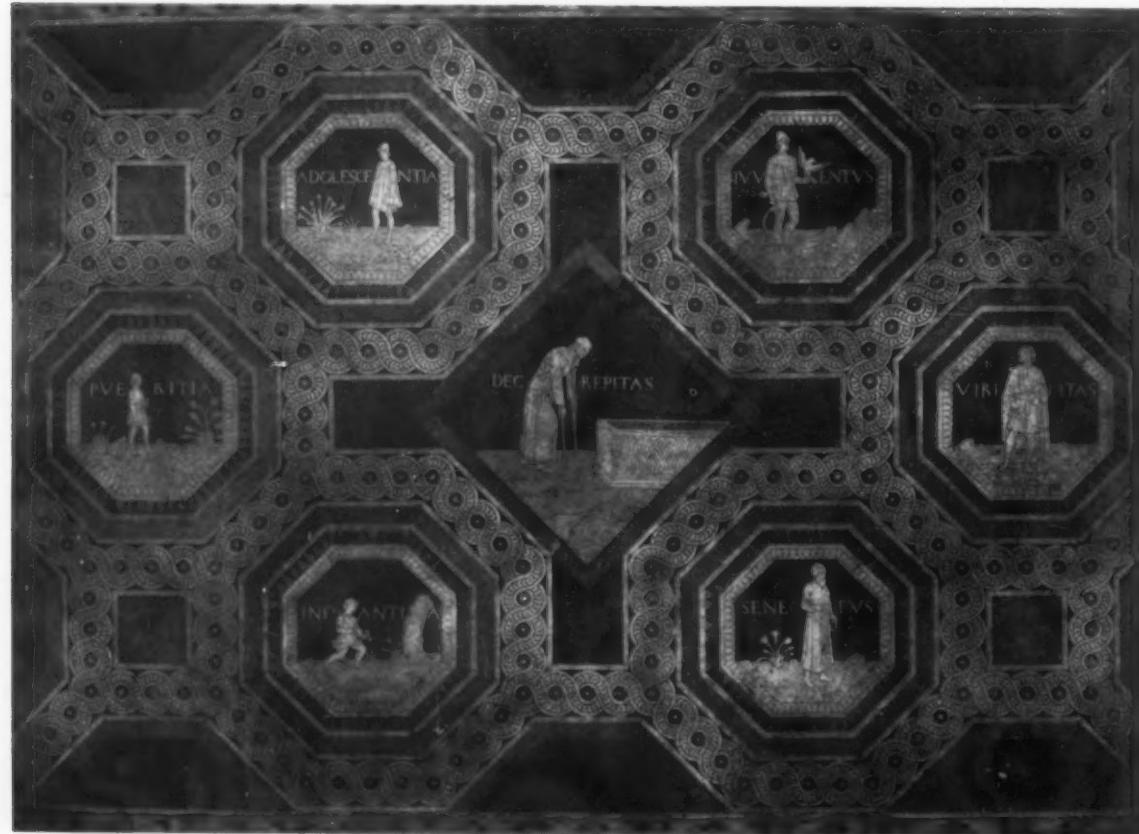


Fig. 4. "The Seven Ages of Man" wrought by Antonio Federighi, 1475, Cathedral of Siena



Fig. 5. Engraved Border by Bastiano di Francesco, Cathedral of Siena

opus sectile, the floor of the Cathedral of Siena stands quite alone. Although examples of a similar sort of paving decoration are to be found to a limited extent in the Cathedral at Lucca, in the Piccolomini Chapel at San Francesco in Siena and in the Chapel of Santa Caterina in San Domenico, in the same city, it was only in the Cathedral of Siena that this species of floor embellishment attained perfect execution and was employed to an extent that compels at least the wonder, if not the admiring approval, of all who behold it.

The whole pavement (Fig. 3) represents a daring and original conception, the fulfillment of which required a number of years and the services of many designers and artificers—a conception that contemplated covering the entire floor space with a series of pictorial compositions wrought in stone. The major designs were based upon scriptural, apocryphal and symbolic subjects (Figs. 6, 1, 4), while the minor designs, such as the enclosing borders, contained geometrical patterns (Fig. 1) and a great diversity of graceful and fascinating renaissance motifs (Fig. 5).

The work began about the middle of the fourteenth century and was carried on until the middle of the sixteenth. Indeed, a few additions in the same manner were made as late as the latter part of the eighteenth century. Altogether, about fifty artists, at one time or another, had a share in the work, some of them, such as Pinturicchio and Beccafumi, men whose renown in other fields of art has made their names famous. Considering the number of artists engaged and length of time over which their labors extended, it would be strange if the total result did not show evidence of some evolution in technique and con-

ception. Nevertheless, the pavement exhibits a remarkable unity of purpose and decorative aspect.

The entire cathedral floor is divided into sections that correspond more or less exactly with the architectural subdivisions of the building (Fig. 3). The floor area in the five bays of the nave, for example, is divided into five corresponding equal spaces, each of which contains a major motif set within its appropriate border. In like manner the corresponding spaces in the aisles are given over to depicting the ten sibyls, five in the north aisle and five in the south. The hexagonal space underneath the dome is subdivided into seven hexagons and six lozenges, each containing a separate subject enclosed in its own border (Fig. 6). So likewise have the transepts, the choir, the sacristy and the ambulatory their own distinct schemes of representations, for the most part symmetrically disposed and arranged with due regard to symbolic sequence.

The method of execution, upon close examination,



Fig. 6. Elijah and Ahab, from Design by Beccafumi, Cathedral of Siena

tion, proves to be singularly direct and not nearly so complex as might, upon a superficial glance, appear. The pieces of marble are of various sizes, frequently large, and are laid together very much in the manner of the units in puzzle maps, in irregular segments, yet in strict accordance with design.

The pavement is executed very largely in black and white marble. Much of the earliest work, and likewise much of the best, was done altogether in black and white. In other compositions, however, red marble was introduced for the ground and black was used for the sky. In the decorative borders that framed the compositions marbles of divers colors began to be employed at an early date. Later they found their way into the main compositions themselves and greens, reds, yellows and other colors, sometimes managed with striking effect, are to be seen in some of the work. Pinturicchio, with his passion for color, was especially given to polychrome treatment.

The subjects were first silhouetted in white marble let into the background of black, or of black and colored, marble. Details were then wrought upon the white marble by engraving lines with a graving tool or fine chisel; next the lines were accentuated by dots or small holes made with a trepanning drill and then these incisions were filled up with mastic or stucco, in the manner already indicated, and connected so as to appear as one continuous line, thick or thin, as required by the design.* There is comparatively little filling of

extensive sinkages with mastic or stucco, and the marvelous result is compassed chiefly by adroit composition of the masses and by the nicest fitting of the whites into the black, or black and colored, background. The work is virtually sculpture in two dimensions.

The pieces of white marble forming the design in silhouette are not so numerous as one might at first imagine. In the earlier part of this *commesso* work, as the Italians call it, there is no attempt at shading through the use of graded hues of marble. It was not until the later stages of the process that this element of complexity was introduced, with a consequent loss of virility and directness.

In Fig. 1, showing the Emperor Sigismund on his throne, we see one of the best examples of the earlier method of treatment, while in Fig. 6 where, to a certain extent marbles of graded tone are introduced for shading values, may be seen the method of the later treatment which of course greatly enhanced the decorative appearance.

The chief function of the decorated pavement is to supply texture and color in the floor area so that both may support, and be in harmony with, the composition of the entire interior and minister to its enrichment and interest. This may be attained by the multiplex use of repeating patterns, or the scheme may go beyond the mere employment of varied repeats and may supply spots of special interest whereon the eye may rest and find delight, as in the floor of the Cathedral at Siena, so long as the monumental or symbolic and conventionalized treatment is maintained.

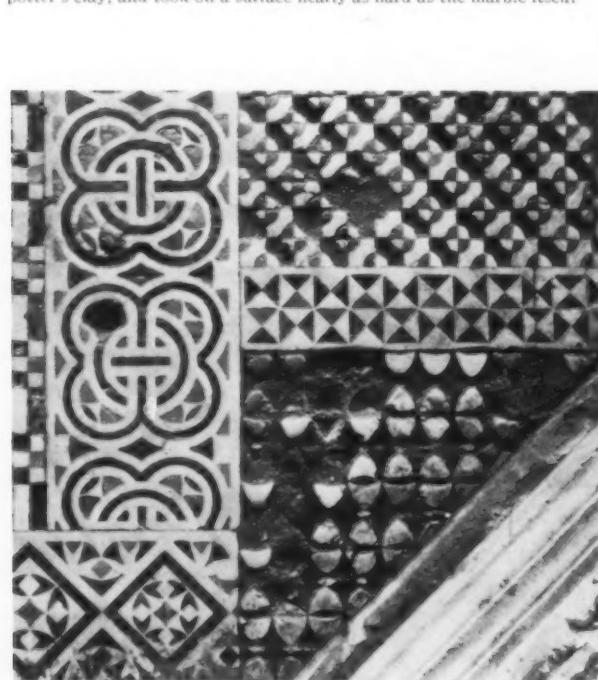


Fig. 7. Section of Inlaid Marble Floor in the Baptistry,
Florence

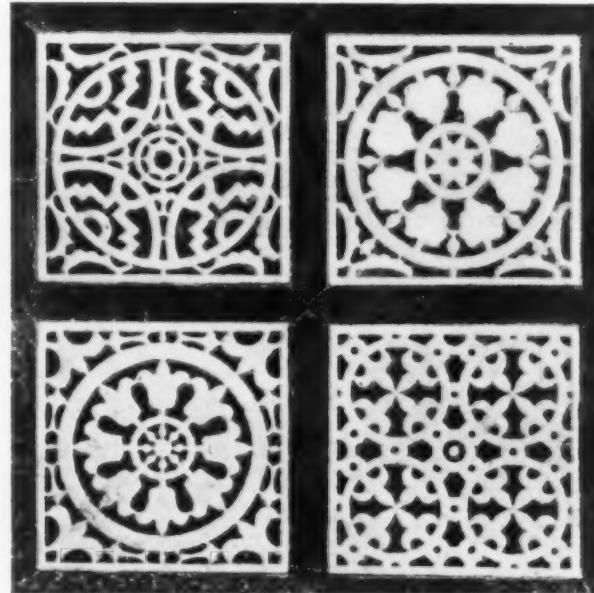


Fig. 8. Detail of Floor Pavement in San Miniato al Monte,
Florence

* The mastic used at Siena was composed of pitch, resin and pounded potter's clay, and took on a surface nearly as hard as the marble itself.

The Draftsman's Own Data File

By H. VANDERVOORT WALSH

ARCHITECTURAL or constructional drafting requires so much information back of it that it often seems that the actual drafting is merely incidental to the knowledge which must be at the finger tips of the draftsman. In fact there is so much to be retained in the mind that the experienced draftsman comes to the conclusion that it cannot all be kept there and so looks about for some other means. Of course a little notebook or a library of text-books is the most natural thing to turn to. Both methods are cumbersome, however, and as the draftsman as well as any other worker needs system, some suggestions might aid him.

If he will examine the question carefully, the draftsman will have little difficulty in appreciating the scattered condition that his necessary working data is in. Hand-books, text-books, building codes, insurance regulations, magazines, manufacturers' catalogs and note-book jottings are a few of the things he will want. Unless he knows exactly where to look he will spend more time looking for information than it is worth. The real solution of the problem is to develop what is here called the draftsman's own data file. This is essentially nothing more than a card index, but it is planned to meet the requirements of the draftsman's peculiar needs. Most books are intended not for the draftsman, but to aid the average builder, superintendent, specification writer or draftsman, and therefore they contain a great deal of material which is not of any help in the particular emergency at hand, but which, nevertheless, must be waded through to get at the matter relating to the drafting. Thus more valuable time is lost.

There is nothing unusual about the equipment necessary, but the arrangement of the data file is the unique part. The best sized cards to secure for this file are 5 x 8. A light file box about a foot deep should also be obtained as well as a more permanent file case with a number of drawers in it, but this might be acquired after the small file box has been outgrown. The cards ought to be cross sectioned so that scale drawings in the form of freehand sketches can be made on them. A good set of blank signal cards should also be included.

The chief thing to bear in mind in making this file is that it is intended to simplify matters and therefore it should not contain anything that is not absolutely essential. As far as possible, every card should have its information in drawing form with plenty of notes. Standard sized details of such things as plumbing fixtures should be assembled on a card so that they can be slid under the tracing and made to fit the desired location and then copied line for line through the linen. This plan

of having scale drawings of standard forms on the cards and using them to trace over whenever they are needed is a great labor saver.

The material essential for this file will be found under two heads. First, we have facts which limit the design because of certain constructional requirements. In certain localities there are customary ways of doing things. Then too, our materials and shapes limit our designs and therefore we must have a record of these facts. Building codes and insurance regulations are also necessary data, but the most important are cost-saving schemes.

The second set of limitations falls under usefulness. There are certain standard sizes which experience has shown certain articles should be in order that they may be useful. Then too, there are sanitary considerations which are essential. Light and ventilation, climatic regulations and fire-proofing are a few more limiting factors of design which must be handy when the draftsman is busy, and above all are the factors which are peculiarly connected with the purpose and equipment of a building.

To get anywhere at all, these things must be known by the draftsman. The artistic development of the design comes naturally along when these problems have been solved.

We can therefore divide the file into two main divisions and entitle them (*A*) *Construction Requirements* and (*B*) *Usefulness Requirements*. Everything collected then will be placed under one of these headings and given the signal letter of either (*A*) or (*B*).

On the whole, the file might be classified somewhat in this manner:

(*A*) *Construction Requirements*

1—Customs of Construction

- a, Carpentry
- b, Masonry
- c, Metalwork, etc.

2—Materials and Shapes

- a, Carpentry, etc.

3—Building Regulations

- a, Carpentry, etc.

4—Costs

- a, Carpentry, etc.

(*B*) *Usefulness Requirements*

1—Sizes Relative to Use

- a, Carpentry, etc.

2—Sanitation

3—Light and Ventilation

4—Climatic Regulations

5—Fireproofing

6—Equipment

This list is merely a skeleton outline or suggestion for the file. The signal cards for the main headings

might preferably be red and those for the sub-headings, like *Carpentry*, *Masonry*, etc., which are repeated for each main division, might be yellow. Corresponding to the filing method of the cards there could be a master list which would record every card in the file and exactly where it goes. This list is used for rapid reference only, for it gives a bird's-eye view of the whole index. For convenience it might be placed on the inside of the file box cover or mounted on a heavy piece of cardboard and hung near enough for use.

Every card might be marked with its various code letters and numbers so that its exact location in the file will be established. The mark (A) will determine its location in the first division, while the further note 2 will locate it under *Materials and Shapes* and then the small code letter b will indicate that it comes under *Masonry*, etc. For rapid reference a number of green signal cards should be used which can be slipped in the place where a card is removed and thus aid in securing its quick return to the file after using it.

With this brief outline of the filing system, let us examine more carefully the sorting out of our material for use. Do not forget that this information is for drafting only and that we do not want to include anything else otherwise its purpose will be defeated. As far as possible all the notes on the cards should be made by means of scale drawings and little explanatory jottings of sizes and purposes. No attempt should be made to record any artistic forms, for that is not included in this file.

Under (A) 1—*Customs of Construction* many notes will be made of any peculiar methods used in the community where the work of the office is mostly located or of certain odd methods of doing things which the boss has decided upon as standards for his office. It is curious how many traditions there are floating around which have no more reason to exist than that things have always been done that way. A man may some day have the courage to buck up against them and refuse to follow them but that has nothing to do with the fact that he is supposed to know them. Under the subtitle of *Carpentry* will fall most of this information. The chief thing to note in classifying material under this heading is that it consists of the unusual kinks—things which are very local in character. Perhaps there is a certain way of designing a sill for the houses in a certain locality. It would be well to make a note of it, for someone might make one a laughing stock if in a design one showed a sill copied from a well known text-book on carpentry. It is not a case of which is right but of doing as the Romans do when you are in Rome.

Facts to be collected under (A) 2—*Materials and Shapes* are very numerous. There are many standard sizes and shapes of materials which must be known before any adequate design can be made where they are used. This information lends itself to tables better than drawings, although in many cases certain materials demand certain methods

of construction peculiar to the manufacturers' development, and a few sketches may aid the memory. One may even have suggested references to certain catalogs where more information can be obtained; better yet it would be to clip out any particularly useful prints or tables from these catalogs and paste them on the file cards. In doing this it is always wise to paste another piece of paper on the back of the card, otherwise it will have a tendency to curl and destroy the even order of the index. Try to pick out the essential facts which will aid directly in drafting. There are many so-called standard sizes of dressed lumber, but there are actually only certain real standards which one will use in designing. It is this kind of selective classifying one must make in order to get rid of a lot of confusing facts. The same is true when it comes to standard sizes of bricks or other burnt clay products. There are many different makes and sizes but it would be foolish to attempt to include them all in the file. What one wants are the sizes of those materials actually being used.

The same thing is true when it comes to facts for the file under (A) 3—*Building Regulations*. It is not necessary to file the entire building code, piece by piece, in the little box. All that is necessary is to have certain peculiar restrictions and certain limitations which a draftsman will hesitate about each time he meets them. Keep in mind that this file is merely a jog to the memory. Only those facts which are difficult to retain in the mind should be classified. Do not overload it with facts which will be of no use whatsoever in drafting. Whenever certain cards become so familiar that their information is well ingrained in the memory the card might be removed from the file for it will only be an incumbrance.

One of the most important parts of the file to keep constantly changing is the (A) 4—*Costs* classification. In this should be filed all the odds and ends of information which can be gathered concerning the ways of cutting down the costs of construction. There are often many ways of doing the same thing, but the cheapest often will be the way one is interested in. Facts of this nature may not stick in the memory very well so, when one comes across them, a rough sketch, noting the principle involved, will often come in very handy at the critical moment when cost is a vital question. There is an astonishing amount of data of this nature drifting around and it is of such importance that it is often worth a great deal to have it on hand. In fact the average draftsman is quite ignorant of money-saving methods of doing things, and he does not always realize the amount of work which often a few changes of lines on the design will save. In carpentry, masonry and steelwork there is much to be learned in this respect. There will probably be more scientific study of this question taken up in the coming reconstruction days than anyone can predict. After all, the real economy of construction will be in the careful de-

signing of a house and not in trying to find the lowest bidder. Elimination of waste material and energy is more a sign of efficiency than the grinding down of wages and prices, and designers who can show results in this way will be recognized more in the future than they have been in the past.

When it comes to the question of classifying the material under the division of (B) *Usefulness Requirements*, as has been previously suggested, the subdivision of (B) 1—*Sizes Relative to Use* is quite limited in its scope for only those facts which pertain to the actual dimensions of things as they relate to the users are collected. Nearly everything that is designed in a building in the way of usefulness is designed in sizes which are supposed to be most convenient to the users. This is particularly true of the layout of kitchens where all the accessories are supposed to be planned in certain dimensions which give the most efficient use. However there is practically no part of any building which is not affected by these requirements. As there are a great many facts in this line which have been developed by experience and which are fully standardized, it will be almost impossible for the draftsman to keep these constantly at his finger tips, and yet every move he makes must be governed by these accepted sizes. It behooves him, therefore, to get this necessary information into as workable a shape as possible, but at the same time to keep it separate from sizes of things which are really building equipment.

When it comes to collecting data for the classification (B) 2—*Sanitation* the only thing which should go in is matter relating to certain standards of sanitation. There are many precautions and accepted details of doing things in this department of building design and a convenient file for collecting this information is quite necessary. As this is so intimately linked up with all kinds of plumbing work it would be well to classify such information under this heading instead of as building equipment. Sketches of standard details should be made and clippings of catalog drawings pasted on the cards. Special notes and tables will aid much in recording this data.

Under the heading (B) 3—*Light and Ventilation* will be filed such facts as those which determine the proper arrangement and sizes for designing windows to give the correct amount of light and ventilation. Any facts related to artificial lighting as it relates directly to the drafting may be filed, but much of this material is more for the use of the specification writer and it should be sorted with care. The same is true in regard to any facts which are collected about ventilation. Many of them do not affect the drawings at all and they will therefore be of no use in this file. It is a specialized file and does not pretend to be anything else. In glancing over catalogs of various ventilating

systems it would seem almost that the information is impossible to file, but on a careful analysis of the facts it will present no trouble.

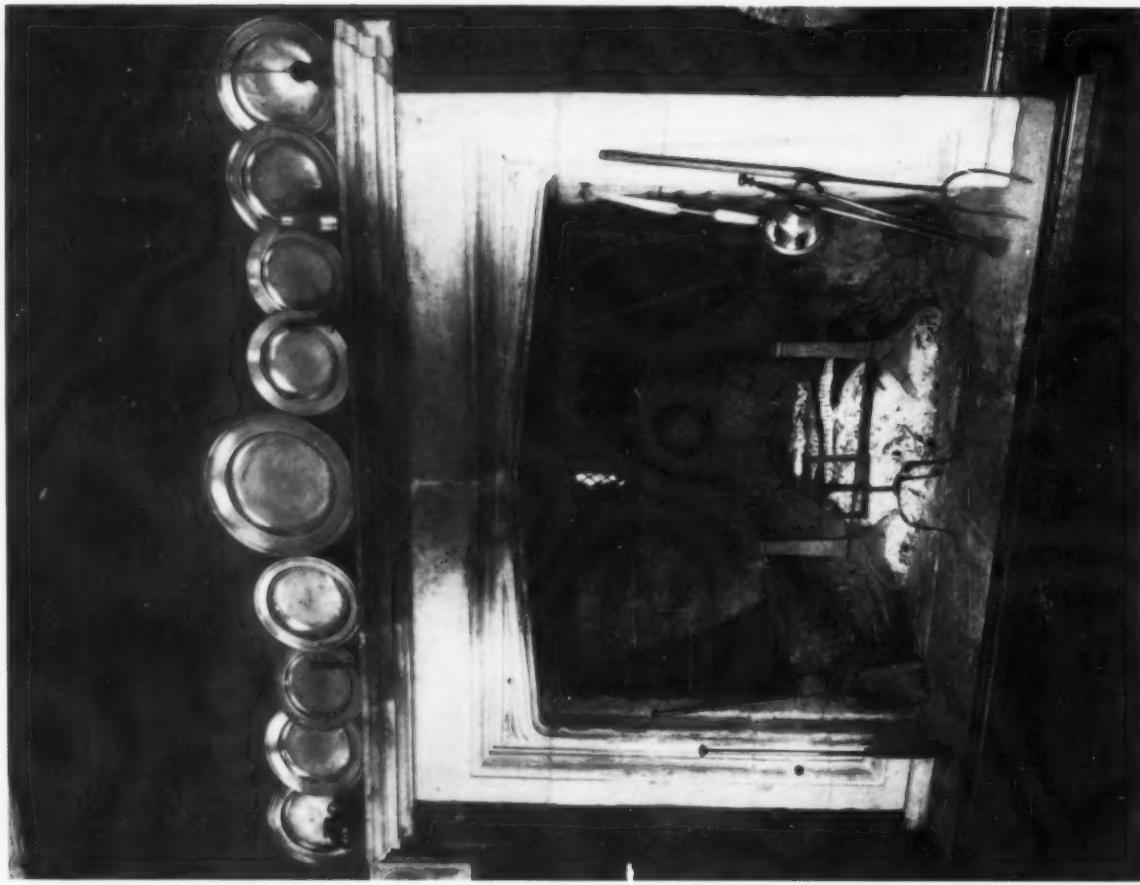
The classification (B) 4—*Climatic Regulations* will not require much attention if the draftsman is confining his work to certain localities, but if his field is broad it will be well to collect facts relating to this subject.

(B) 5—*Fireproofing* is a classification of data which can easily be made very bulky if it is not pruned down with care. There is so much material of this nature that is irrelevant to drafting and common practice that it is sometimes confusing. A good deal of common sense will have to be exercised in collecting this working data. It will hardly be worth while to collect more than is actually necessary for the types of buildings which the draftsman is handling.

The same will hold true of (B) 6—*Equipment* where there is so much information to keep. File only those facts which are standard for all types of buildings and leave out all which do not apply to the peculiar types which the draftsman is handling. Certain standard sized drawings of furniture will often aid in the layout of a room; by sliding these cards under the linen and shifting them to trial places until satisfactorily located, the drawings may be traced.

In general, the entire file should be looked upon as a personal file and memory jog. No two files should be alike. Just as soon as information contained in the file becomes second nature, eliminate the card. A secondary file might be kept where these obsolete cards can be placed, but this is optional with the draftsman, according to his faith in his memory. Make the file highly specialized and train the powers of elimination. Record as far as possible everything in picture form, for this will gradually impress the facts upon the memory better than anything else could do, and every detail that can be filed in the memory can be eliminated from the file.

There is probably no better way to record dry facts and statistics, when we want to get them impressed on the memory, than to take them in the spirit of fun and try to convert them into funny, exaggerated pictures. For some reason or other the impression on the mind is more lasting, and as the draftsman has a natural gift for visualizing he can develop in this way a memory for facts and statistics which will make the average man marvel. The ability which the ordinary draftsman has in him would astonish the world if it were released by proper methods, and the day is not far off when his emancipation from many evils will come. One of the ways by which he can free himself is to use all the methods possible for the reduction of the drudgery of drafting, and it is to be hoped that the suggestions given will be of aid in this respect.



TWO STONE MANTELS FROM OLD COTSWOLD HOUSES IN ENGLAND
In the example at the left the frieze above the mantel is a vigorous piece of old English
plaster work. The mantel at the right is placed against an oak-paneled chimney-breast

A Modernly Planned Orphanage

WHITEHOUSE & PRICE, ARCHITECTS

By H. C. WHITEHOUSE

THE Hutton Settlement is a cottage planned orphanage situated about nine miles east of Spokane, Washington and is built on a piece of ground at the base of hills forming the north side of the Spokane valley. The institution was the gift of Mr. L. W. Hutton, of Spokane.

The children are admitted into the institution at school age and the boys and girls are housed in separate units or cottages, of which there are four. The capacity of each cottage is about twenty-five. The ages are graduated from six years up to high school age.

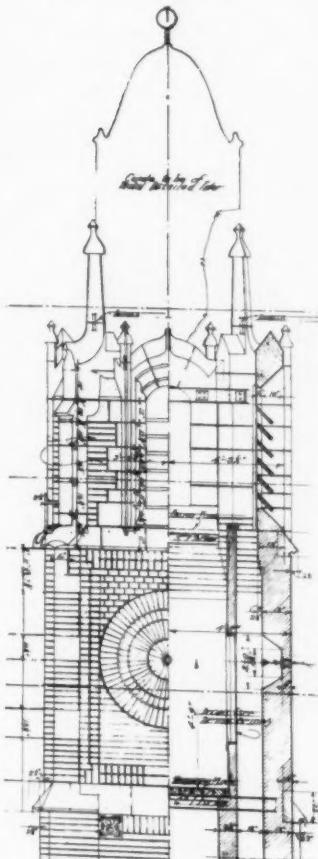
The buildings are planned for the efficient handling of the domestic work by the children themselves under the direction of a cottage matron, or mother, who directs the cooking, dishwashing and general housework done by the children.

The requirements in each cottage plan were practically the same, each plan varying somewhat in general shape to create different exteriors. The plan of each cottage consists,

on the first floor, of a large living room and living porch, matron's sitting room, sewing room, dining room, kitchen, bath and large washroom, together with lockers; on the second floor are bedrooms, matron's bedroom and bath, a large general toilet and one separate bathroom. The attic, or third floor, is divided into several single rooms.

A definite plan for housing the children in the sleeping rooms is followed. The youngest children are placed five and six in a room, and the next or middle group are placed three in a room, while the oldest are placed in single rooms. All bedrooms are well ventilated, especially those holding groups of three and five children. The bedrooms of five-bed capacity have windows on three sides and those of three-bed capacity have ventilation from two sides. All windows and beds are placed so that no child has a direct draft across the head, and all beds are single.

The general scheme of planning has been worked out embodying



Detail of Clock Tower



View of Administration Group with Auditorium Wing at Left



Detail of Cottage Number Two

the principles as set forth by the writer in his articles of February and March, 1919, published in THE ARCHITECTURAL FORUM.

The construction throughout the group is fire-proof. The foundations are of concrete and the walls are of hollow clay tile, faced with a tapestry brick. The floor construction is flat slab in most cases, and bears directly upon the masonry walls. All partitions are hollow tile.

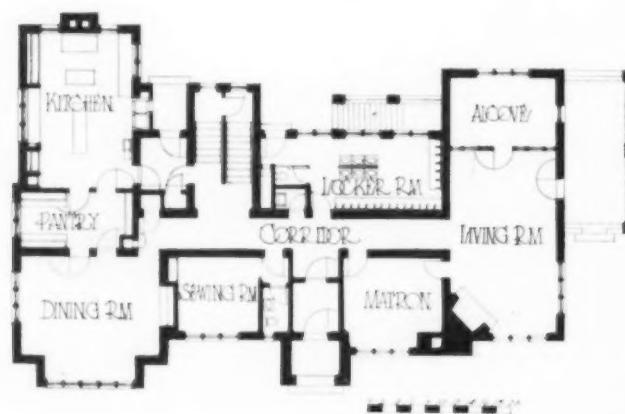
The slate roofs are of framed, heavy timber construction and the buildings in most cases have

no exposed woodwork in the way of eaves or other structural members. The roofs are slate of variegated grays, gray-greens and a few mottled purple and green. The slate is graduated from a double, one-inch thickness at the eaves, up to one-fourth inch at the ridge. The eaves slates start on the brick work which is corbeled out with special long-length brick, the ends of which terminate in stone corbels.

The windows throughout are fitted with special window adjusters, which gives 100 per cent ventilation. The screens are double-hung, and are all inside. The porch floors are laid with red quarry tile.

The interiors throughout are finished in quarter-sawed white oak stained a silver gray. The floors throughout are oak and maple. A feature of the buildings, particularly the cottage units, is the terrazzo stairways. This material was selected because of its great durability, and from the standpoint of sanitation. All angles are coved and the balustrades are solid with handrails attached.

The general toilets are an important feature in the cottage units. The wash basins, eight in number, are arranged back to back against a low wall which is built up from the center of the floor, all plumbing pipes being built into the wall. The basins are placed at different levels to accommodate the heights of the various children. The water closets, three in number, are of the wall type, fitted with flush valves. The shower baths, which are also in the general toilet rooms, are overhead showers. The toilet room floors, wainscots, water closet and



First and Second Floor Plans of Cottage Number Two



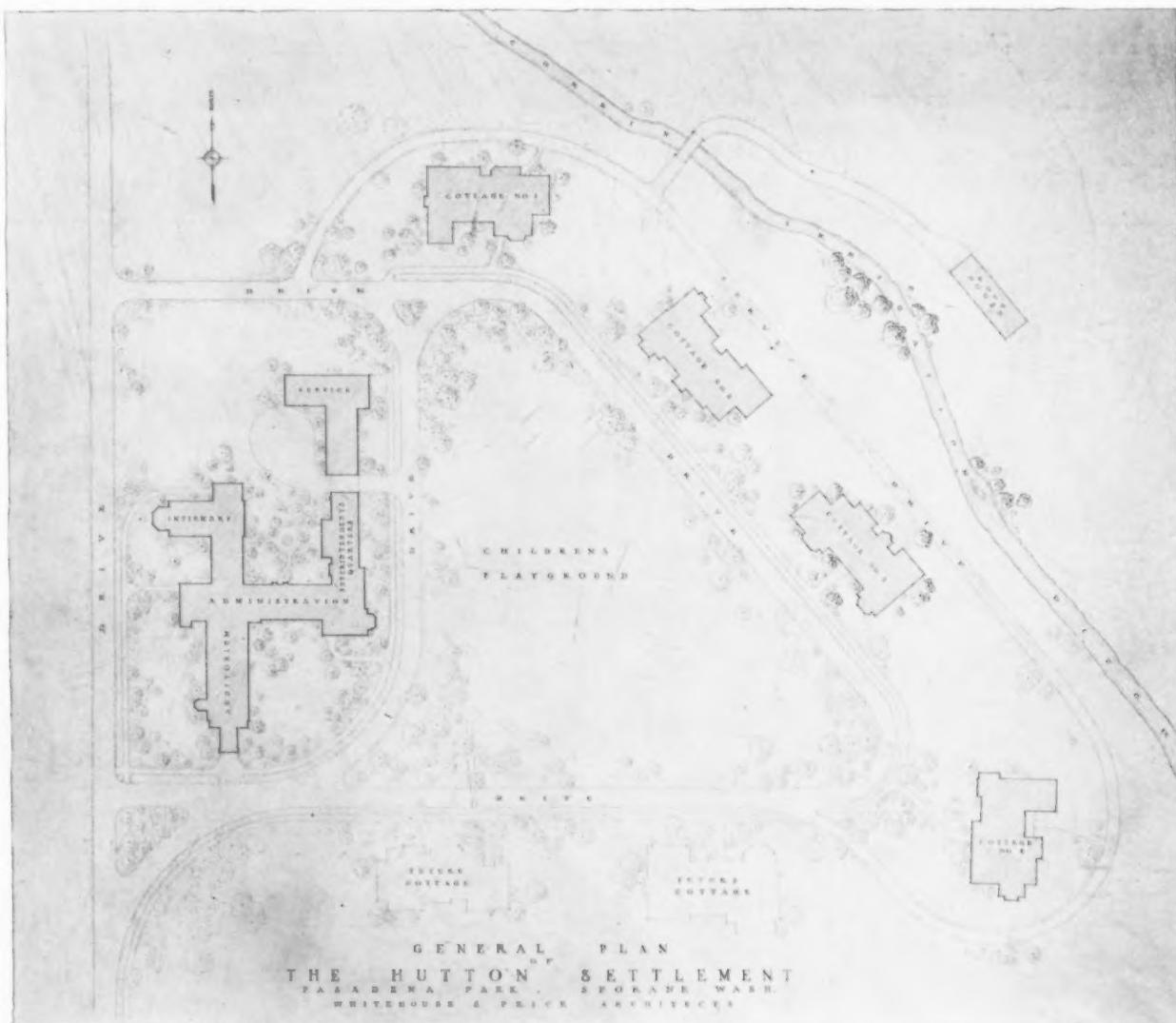
First and Second Floor Plans of Cottage Number One

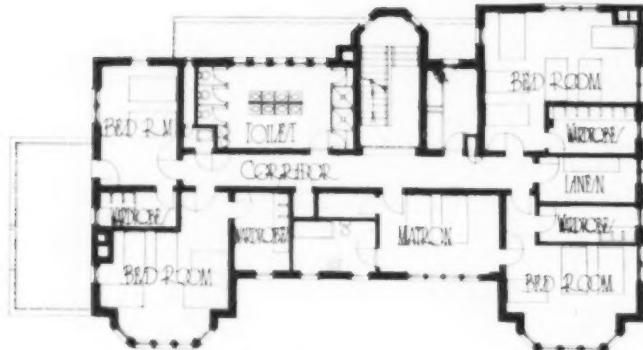
shower partitions, are all terrazzo. The windows from the toilets are fitted with steel casements, glazed with plate glass. This type of window was chosen to preclude any possibility of shrinking and swelling caused by steam from the shower baths.

There is also a separate bathroom for the bathing of the small children by the matron, which contains two bath tubs. One is set on the floor and one

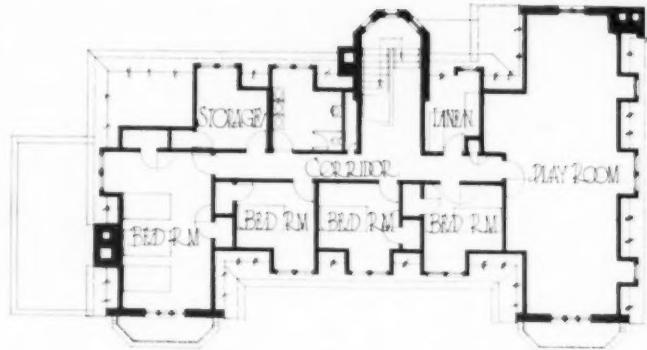
at a height of two feet from the floor, for facilitating the handling of the bathing of the smaller children.

The kitchens, where a very important part of the child's training comes in, are entirely modern and up to date. All cupboards are built flush with the walls, all doors, etc., are flat finish, without panels or mouldings. The kitchen floors are linoleum cemented over the concrete floor slabs





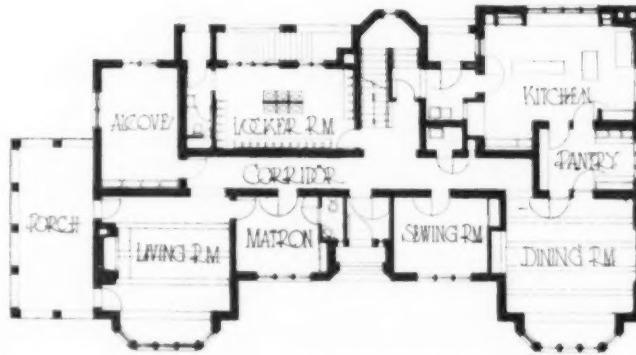
Second Floor Plan



Third Floor Plan

which are finished with a terrazzo cove base around the entire room.

The cooking is done on electric ranges. The dish washing sink, or sink for general use, is of a special design type which is placed in the center of the kitchen. These sinks have double sets of faucets, with double compartments to facilitate the washing of dishes by a large number of children; it is possible for six children to wash and dry dishes at the same time. There is also a small vegetable

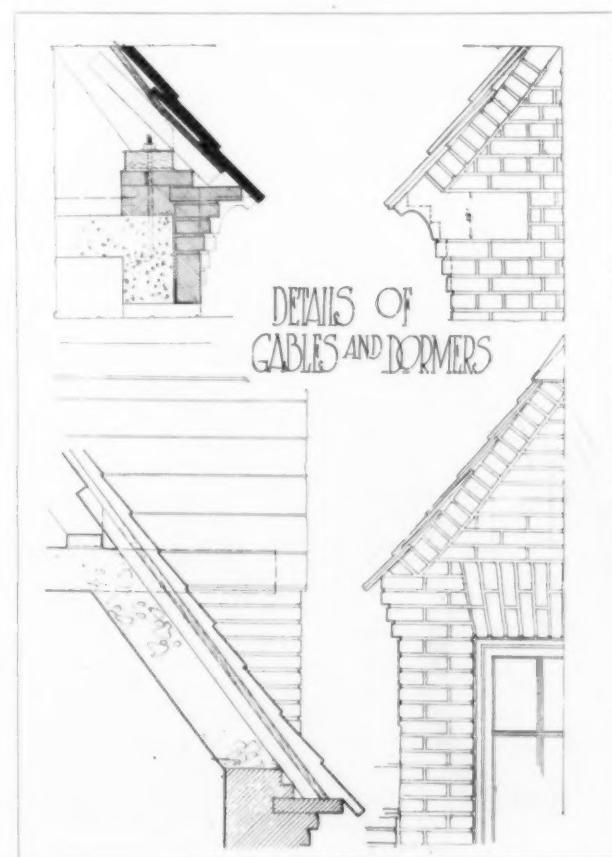
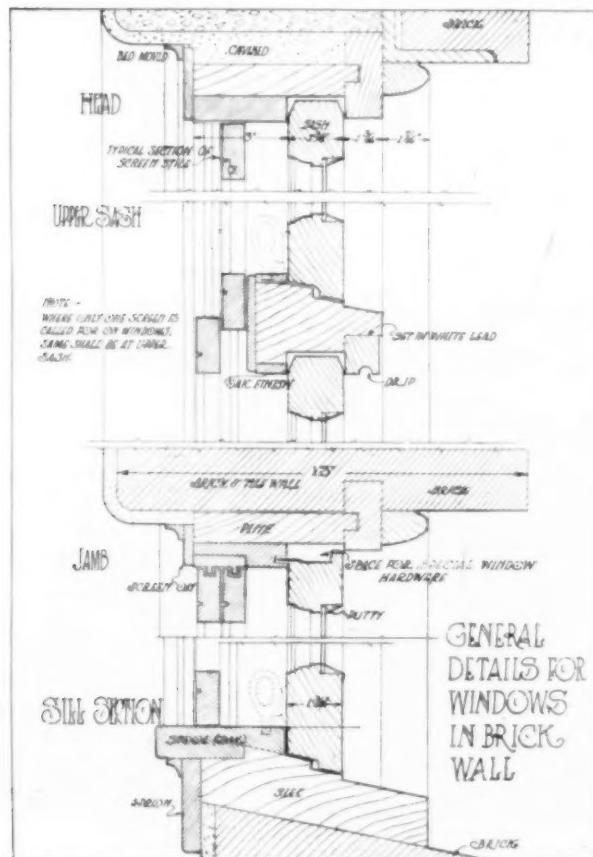


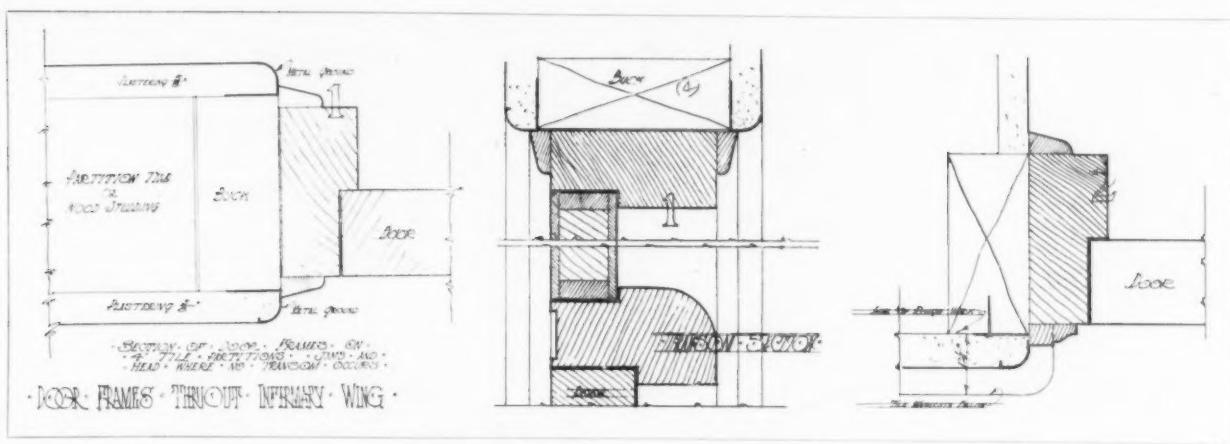
First Floor Plan of Cottage Number Three

sink at the rear entrance vestibule for the washing of vegetables.

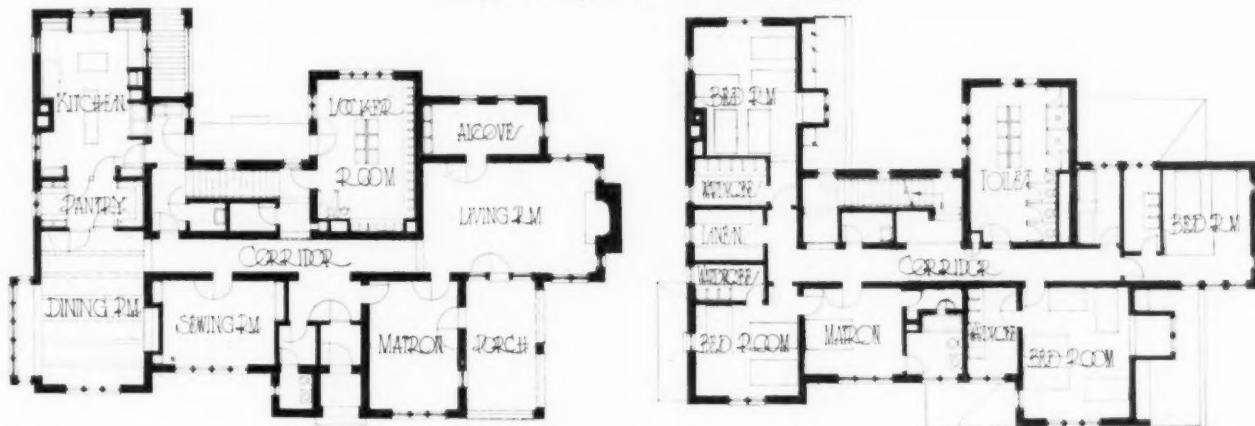
The refrigerators have floors of tile and the interiors are finished in white enameled metal. These are built in and form an integral part of the construction and are iced from the outside.

The administration building contains the superintendent's quarters at the front, and in the rear the quarters for help, the kitchen, electric bread bakery, refrigerating plant for the storage of meats, general





Examples of Simple Treatment for Interior Finish



First and Second Floor Plans of Cottage Number Four



View of Cottage Number Four, Hutton Settlement, Spokane, Washington



Kitchen Showing Special Fitments



Infirmary Ward in Administration Group

sewing room, rooms for relief matrons, a general reception room for the entertainment of guests, and an auditorium with a stage, moving picture booth, etc. The auditorium is used for dances and other purposes of a social nature and its brick walls and open timber roof make it one of the most interesting details of the Settlement. The tower will house the clock, which is not yet installed.

The infirmary occupies one wing of the administration building, but is so planned that it is apart from the rest of the building, and is quiet. The infirmary is most complete, the second floor being given over to boys and the first floor to girls. A small surgery department takes care of minor operations, such as the removal of tonsils, adenoids, etc., and a well equipped dental department with waiting and operating rooms is available when needed. Both surgery and dental departments are provided for the use of visiting surgeons and dentists. The finish of the walls and woodwork throughout is white enamel and all trim around

windows, doors, etc., has been omitted and plaster returns substituted. The angle at the floor is a maple cove and every detail throughout has been well studied for thorough sanitation as will be seen by details on preceding pages.

In the planning of the buildings the architects have striven for an air of domesticity and anything that would have a tendency to suggest an institution has been omitted. One of the requirements of the donor was that the institution should have a homelike atmosphere. For this reason everything possible has been done to give the Settlement the atmosphere of a home. Its character is suggested by the little reception room in which visitors are received and in the sunny living rooms which are provided in the different buildings. A detail which helps to keep away the institutional atmosphere is the individual heating plant for each building. A central heating plant would have called for a high chimney which might have been a very conspicuous feature of the group.



Dining Room in Cottage Number Three



Hutton Settlement, Spokane, Washington

Living Room in Cottage Number Two

An Apartment House of Distinctive Design

RICHARD ARNOLD FISHER, ARCHITECT

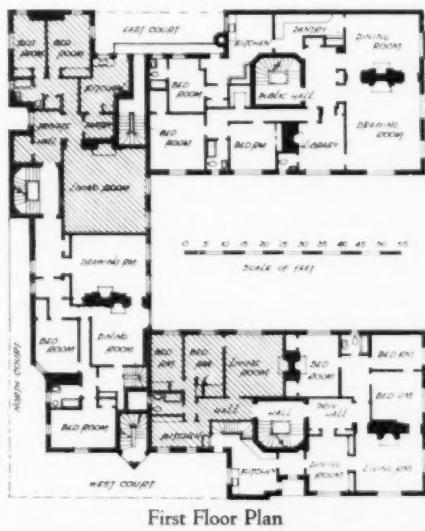
THAT some very successful building is often attained largely as a result of what seemed to be heavy handicaps has been proved again and again in the modern practice of architecture, and a recent instance is found in an apartment house of a distinctive type which has been recently completed near the foot of Beacon Hill in Boston.

The appearance of the building as well as its interior planning are due in a large measure to circumstances which at one time did not seem to be favorable to the development of a successful apartment house. A group of ten city houses had been designed for the site, planned to occupy three sides of a hollow square, most of the houses facing the open space at the center of the plot. The building of the group of houses was abandoned when the foundations had been completed and the problem which confronted the architect was, therefore, the planning of an apartment house

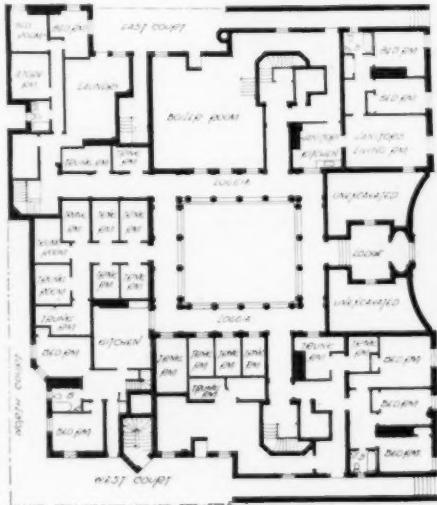
which could be erected advantageously upon very costly foundations which had been planned for structures of quite a different nature.

As the plan developed what was to have been an open square or garden, upon which ten residences might face, has become an open courtyard or patio enclosed upon all four sides by an open loggia; the present building, built around three sides of this courtyard, rests upon the original foundations, the plan having been so worked out that advantage has been taken of walls, piers, footings for chimneys, etc., which were originally built.

The exterior of the building is attractive and unusual. Outer walls are of brick with trimming of stone and considerable use has been made of iron in the form of grilles and of clay pipe of different sizes which has been employed with excellent results in the working out of horizontal panels in the parapets about the loggia and at the



First Floor Plan



Basement Floor Plan



Loggia Entranceway around Courtyard

top of the building, around certain balconies and to screen open light shafts on the exposed sides of the building. Since the structure covers a somewhat ample area it has been possible to make the apartment house the required size without more than six stories which include the basement, or entrance, floor.

From the street the main entrance is directly into a small lodge or vestibule from which visitors are announced to the various apartments. From this lodge one passes down a short flight of steps into the patio or courtyard—a tiny garden, surrounded by a vaulted loggia—which occupies the center of the property. Opening from this loggia are the various doorways into spacious entrance halls where electric elevators lead to the different groups of apartments. The planning of



Second and Third Floor Plans Showing Typical Duplex Apartments

the building has been done so that the living and dining rooms and all master bedrooms face either the street or the courtyard, which gives to each all necessary light, air and sunshine as well as an attractive outlook.

The apartments, which are of different sizes, vary greatly as to plan; some of them are upon one floor while others, being duplex apartments, occupy parts of two floors, private stairways leading from one floor to another. The arrangement of the duplex apartments has been influenced to some extent by the planning of the exterior; thus, since the larger windows with balconies occur at the second and fifth floors, duplex apartments upon the second and third floors are arranged so that the more important rooms are upon the lower floor with stairways to the bedrooms above, while the duplex apartments upon the fourth and fifth floors have their more important rooms upon the upper floor with the bedrooms upon the floor below.

Delivery entrances from the street give access to the service quarters of all the apartments. The space surrounding the patio or courtyard, upon the basement floor, is divided into separate trunk or storage rooms one of which belongs to each apartment.

While the building constitutes an extremely successful solution of a difficult problem it is also noteworthy as representing an entirely new idea in the planning of apartment house structures. A great part of the attractiveness of the house is due to the taste and skill with which the architect has planned the patio or courtyard with its fountain, brick walks and heavy growth of shrubbery, surrounded by the open loggia with its brick paved floors and its plain gray vaulted roof.



Example of Large Fifth Floor Windows

DEPARTMENT OF ENGINEERING & CONSTRUCTION

CHARLES A. WHITTEMORE, *Associate Editor*

Building Foundations

PART II

By J. R. WORCESTER, C.E.

IN THE FORUM for September we considered the external conditions which govern the design of foundations, including the loads to be carried and the support afforded by the soil. Of course the composition of the soil is a highly important factor in determining its bearing capacity and considerable data was given in regard to the capacity of soil composed largely of clay. Other very important considerations are presented when the soil is largely, or chiefly, of sand.

With sand the supporting power is dependent upon several factors. One of these is water. Water does not affect the supporting power seriously except in the case of a very fine sand which flows readily with the water. With this, if the water is supplied in unlimited quantity under some head, the sand seems to become super-saturated with it, and to become springy or quaky. In such a condition we have what is called "quicksand" and a load placed upon a bed of it may settle of its own weight until submerged. If, however, the whole surface is covered and there is no chance for the sand and water to escape, it will carry any reasonable load. Another quality of sand which affects its bearing power is its size of grain, not so much the absolute as the relative size. That which contains large and small grains acquires a "cemented" quality giving great resistance to applied loads. A third point of difference between sands is in the shapes of the grains. If grains are sharp and irregular the soil will move less under pressure than when grains are round, from water action, as in beach sand. The nature of the soil to be built upon will thus be found to be a very important matter in planning the foundations which are to be set upon it.

By the word foundation as herein used we mean the portion of an exterior wall below the ground level, and the part of a pier or interior wall below the basement floor, including the footing. The design of the foundation as thus limited will in general be the same, whether supported directly upon the soil or upon piles when placed at frequent intervals.

Interior Walls

The simplest problem is that offered by an interior wall, where the load is uniformly distributed along the wall and the footing is symmetrical about the middle line of the wall. In this case the width is determined by dividing the load per linear foot by the supporting power of the

soil per square foot. The depth of the foundation is generally made only enough to give the necessary spread without overstressing the materials, though greater depth may sometimes be required to reach a proper supporting medium or, in case the basement is open to the air, to get below the danger of frost. When extra depth is not needed, and the spread is moderate, all that is required is a simple footing course. If squared stone is available at a moderate cost this footing can be simply constructed of stone blocks. For ground pressures not exceeding 5 tons per square foot the depth of stone may be safely taken at twice the projection on either side of the wall. If this would require stones thicker than can be easily obtained, or if no stones are available, concrete is the natural material to employ for this type of foundation.

When the projection of the footing course beyond the face of the wall is not great and a good concrete—that is a mixture as rich as 1 part cement to not exceeding 7½ parts of fine and coarse aggregate—is employed, no reinforcing is necessary. Under these circumstances the allowable ratio between projection and depth is dependent upon the pressure per square foot on the soil. The relation may be expressed by the formulæ:

$$\frac{c}{d} = \sqrt{\frac{1.8}{w}} \quad \text{or} \quad \frac{c}{d} = \frac{2.88}{w}$$

in which c = the projection of the footing on each side beyond the face of the wall, d = the depth of footing, both in the same unit, and w = the soil pressure in tons per square foot.

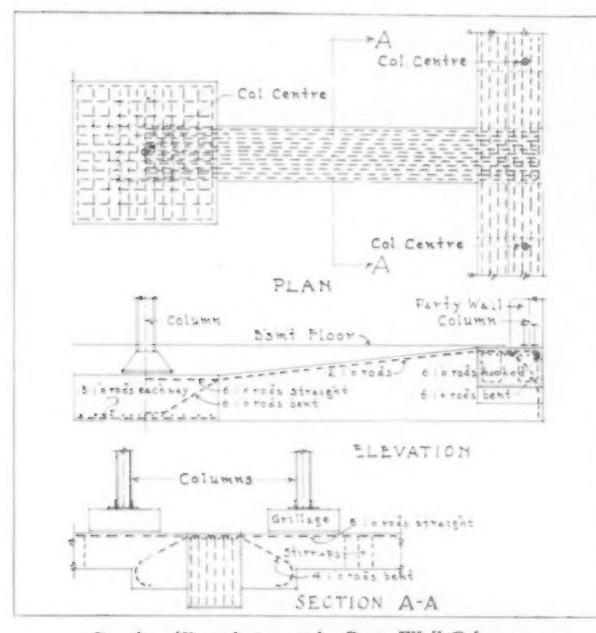
The first of these equations is based upon the bending fiber stress and the second upon the shear, and that giving the lesser value should be used. The first governs for soil pressures up to about 5 tons and the second for greater pressures.

The following gives values of the ratio for pressures on the soil of from 1 to 10 tons per square foot:

Soil pressure; tons per sq. ft.	Ratio of projection to depth	Soil pressure; tons per sq. ft.	Ratio of projection to depth
1	1.34	6	.48
2	.95	7	.41
3	.77	8	.36
4	.67	9	.32
5	.58	10	.29

Table 1

By the use of a proper amount of reinforcement near the bottom of the footing the ratio of projection to depth may be increased. In the case of reinforced footings the concrete should be as rich as 1 part cement to not over 6 parts of mixed fine and coarse aggregate; a sufficient depth of concrete to properly protect the steel should be allowed below the steel — say 3 inches — this not being included in the value of the depth given below; and the



Cantilever Foundation under Party Wall Columns

reinforcing bars should be anchored at the ends by forming hooks or by other suitable means. The area of the steel should be not less than 8/10 per cent of the area of concrete above its center for soil pressures below 4.65 tons per square foot, above which pressure the percentage of steel should be as given by the equation:

$$p = \frac{2.835}{w}$$

and the ratio of projection to depth by the formula:

$$\frac{c}{d} = \frac{7.56}{w}$$

Below a soil pressure of 3.54 tons per square foot the percentage of steel should be 0.8, and the ratio of projection to depth as given by the formula:

$$\frac{c}{d} = \sqrt{\frac{16.125}{w}}$$

c being the projection of the footing beyond the face of the wall on each side, d the depth from center of steel to the top of footing, and w the pressure on the soil in tons per square foot.

Values of the ratio c/d for various soil pressures from 1 to 10 tons per square foot are as follows:

Soil pressure: tons per sq. ft.	Ratio of projection to depth	Percentage of steel
1	4.01	.80
2	2.84	.80
3	2.32	.80
4	1.89	.71
5	1.51	.57
6	1.26	.47
7	1.08	.41
8	.94	.36
9	.84	.32
10	.76	.28

Table 2

As the size of footings increases a point is soon reached where the use of a single rectangular block becomes uneconomical through the waste of concrete in the upper corners of the block. This concrete serves no useful purpose and may well be saved by the construction of steps or by beveling off the corners. Tables 1 and 2 may be used in stepped footings by using for c the entire projection beyond either riser and for d the depth below the bottom of the same riser.

For example, with a soil pressure of 5 tons per square foot and a total projection of 5 feet beyond the face of the wall, a plain footing would need to be 8.62 feet deep,

$$\text{for: } \frac{5}{d} = .58$$

$$d = \frac{5}{.58} = 8.62$$

This depth may be divided into say an upper block 4 feet deep and a lower 4.62 feet deep. The allowable projection of the lower block would be 2.68 feet,

$$\text{for: } \frac{c}{4.62} = .58$$

$$c = 4.62 \times .58 = 2.68$$

The projections of the upper block beyond the face of the wall would then be $5 - 2.68 = 2.32$ feet.

In case a reinforced footing in three steps were desired it might be designed as follows. By Table 2 the depth above the steel should be about 3.3 feet,

$$\text{for: } \frac{5}{d} = 1.51$$

$$d = \frac{5}{1.51} = 3.31$$

If each step is made 1.1 feet deep, the projection of the lowest beyond the second would be 1.66 feet,

$$\text{for: } \frac{c}{1.1} = 1.51$$

$$c = 1.51 \times 1.1 = 1.66$$

The projection of the lower two beyond the upper

step would be 3.32 feet. The projection of the upper step would then be $5 - 3.32 = 1.68$ feet.

The percentage of steel is based upon the total depth at the face of the wall and, in the case of a stepped or beveled footing, the entire area is required to the ends of the bars, which should be fully anchored.

It is generally best to make the lowest block rectangular and not beveled. Where the soil is good this lower block can be cast in a neat excavation without forms and the forms can be built on top of this block. It is important that the set surface of the lower course should be thoroughly cleaned and saturated with water when proceeding to pour subsequent courses. By beveling the upper courses concrete may be saved but the cost of forms is somewhat greater and it is a little more difficult to work the concrete into place. Except in very large foundations the advantage is not great. The beveled surface should, of course, be outside of the interior intersection of riser and tread figured as just described.

Interior Columns

A square column foundation with the column centrally located will have its bottom dimensions determined by the soil pressure, and a top area large enough to accommodate the column base or pedestal without exceeding the allowable unit stresses. With light loads frequently a single block of stone will answer the purpose, but if the load is too great for this treatment concrete, either plain or reinforced, becomes desirable. The depth of the footing is determined generally by the allowable punching shear on a prism the size of the column base and a depth that of the concrete above the center of the steel—if any is used. The shearing stress should not exceed about 40 pounds per square inch with a plain concrete or 105* pounds per square inch with a reinforced concrete. These figures give the minimum depths shown by Table 3, if we allow a bearing pressure on the top surface of the concrete of 640 pounds per square inch, and assume a square column base.

* This figure is based upon 120 pounds per square inch applied to seven-eighths the total depth.

Total col. load; tons	Min. depth in inches	
	Plain concrete	Reinforced concrete
50	50.0	19.0
100	70.5	27.0
150	86.5	32.5
200	100.0	38.0
250	112.0	42.5
300	122.5	46.5
350	132.5	50.0
400	141.5	53.5
450	150.0	56.5
500	158.0	60.0

Table 3

It will be noted that the depth of the reinforced footings is about three-eighths that of the plain concrete; but it should be borne in mind that with the reinforcement an addition should be made to this depth of enough concrete to protect the steel—say 3 inches—and that the mixture needs to be somewhat richer.

The size of the base is of course determined by the pressure on the soil and, with this and the depth as given by Table 3, the outside dimensions are settled. The amount of reinforcement required in each direction, if given as a percentage of the area of cross section of the footing obtained by multiplying the total width by the depth above the center of the reinforcement, is dependent solely upon the soil pressure per square foot. When the depths are according to Table 3, that is as small as the shearing stresses will permit, the following table will give the proper percentage of steel to use for various soil pressures, as obtained by the formula:

$$p = .246 \left(1 - \frac{\sqrt{w}}{6.788}\right)^2$$

in which p = percentage of steel,

w = soil pressure in tons per square foot.

This percentage may be decreased when depths greater than the minimum are used.

Soil pressure; tons per sq. ft.	p	Soil pressure; tons per sq. ft.	p
1	.180	6	.100
2	.156	7	.091
3	.136	8	.083
4	.122	9	.077
5	.110	10	.070

Table 4

The amount of steel required by the above rule should be distributed within a space extending both sides of the column base a distance equal to the depth of the footing plus one-half the remaining

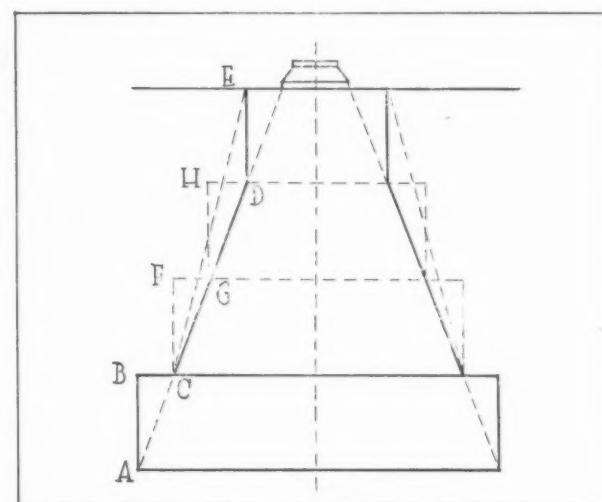


Fig. 1

distance to the edge of the footing. Additional reinforcing bars should be provided in the outer half of this remaining distance, but not necessarily as closely spaced as in the central portion. If the bars are not fully anchored at the ends attention must be paid to the questions of bond and diagonal tension in the concrete.

When the size of the footing is large enough to make it desirable to use a pyramidal shape with beveled or stepped sides, a good rule is to so design the block that no part of a face shall fall within the theoretical truncated pyramid which has for the base that of the lowest course and for the top the column base. Practically this theoretical prism should be increased by making a base course with vertical sides, and enlarging the top sufficiently to provide an area at least twice that of the column base. In Fig. 1 the line *A, B, C, D, E* shows the least allowable dimensions of the foundation, points *C* and *D* being on the theoretical pyramid. Lines *A, B, C, E* and *A, B, C, F, G, H, D, E* show allowable variations which, by adding a little concrete, economize in form construction. The number and height of steps are matters of discretion. It will be found that a height of about 2 feet will give good results.

Grillage Beams

Before the use of reinforced concrete became general the method used for getting a wide spread of foundation without excessive depth was by means of a grillage or cob-house of steel beams. This method is now rarely resorted to, because it is much more expensive than reinforced concrete. It requires nearly as much concrete to properly

Soil pressure ; tons per sq. ft.	Style of footing	Total load on column in tons				
		100	200	300	400	500
2	Reinforced c. Grillage	26.5"	36.5"	44"	50"	55.5"
		22	27	35	45	50
	Difference	4.5	9.5	9	5	5.5
4	Reinforced c. Grillage	26.5"	36.5"	44"	50"	55.5"
		22	27	28	35	45
	Difference	4.5	9.5	16	15	10.5
6	Reinforced c. Grillage	26.5"	36.5"	44"	50"	55.5"
		18	24	28	30	38
	Difference	8.5	12.5	16	20	17.5

Table 5

protect the beams, and very much more steel, and that of a more expensive character. The only justification for the use of a grillage is where deep excavation is objectionable, either as a matter of expense or because it carries the base to a level where the soil is less satisfactory. As these conditions are sometimes encountered it may be worth while to consider the possible saving of depth.

With I beams the question of shear does not control the depth, as it frequently does with concrete, but the bending moment is the critical feature. Table 5 gives the data by which grillages may be designed for various soil pressures and loads of from 100 to 500 tons.

Comparing the allowable depth of grillage foundation with one of reinforced concrete we find the results given in the accompanying Table 6.

It appears from comparison that when it becomes necessary to use more than two tiers of beams the saving in depth is not of great importance, and conditions would seldom warrant going to the extra expense of using beams.

Soil Pressure	Total Load on Foundations					
	100 Tons		200 Tons		300 Tons	
2 Tons per Square Foot	Beams in Tiers	3-12" x 31 [#] x 6'-10"	3-15" x 80 [#] x 9'-9"	4-20" x 80 [#] x 12'-0"	4-15" x 42 [#] x 6'-1"	4-20" x 80 [#] x 9'-3"
	Size of Concrete Blocks	10-7" x 15 [#] x 6'-10"	16-9" x 21 [#] x 9'-9"	15-12" x 31 [#] x 12'-0"	8-15" x 80 [#] x 13'-11"	12-15" x 80 [#] x 15'-6"
	Total Height	2'-10"	2'-3"	2'-11"	3'-9"	4'-2"
4 Tons per Square Foot	Beams in Tiers	3-10" x 25 [#] x 4'-9"	3-15" x 50 [#] x 6'-10"	4-15" x 60 [#] x 8'-5"	4-20" x 80 [#] x 9'-9"	4-15" x 60 [#] x 6'-1"
	Size of Concrete Blocks	7-7" x 15 [#] x 4'-9"	10-9" x 21 [#] x 6'-10"	13-10" x 25 [#] x 8'-5"	12-12" x 40 [#] x 9'-9"	8-15" x 80 [#] x 11'-0"
	Total Height	1'-11"	2'-11"	3'-0"	3'-4" x 10'-0"	3'-0" x 6'-4"
6 Tons per Square Foot	Beams in Tiers	3-9" x 21 [#] x 3'-10"	3-12" x 40 [#] x 5'-6"	4-15" x 42 [#] x 6'-10"	4-15" x 80 [#] x 7'-11"	4-20" x 80 [#] x 8'-11"
	Size of Blocks	8-6" x 12 [#] x 3'-10"	8-9" x 21 [#] x 5'-6"	10-10" x 25 [#] x 6'-10"	9-12" x 40 [#] x 7'-11"	10-15" x 42 [#] x 8'-11"
	Total Height	1'-9"	2'-1"	2'-10" x 7'-1"	3'-2" x 8'-2"	3'-4" x 9'-2"

Table 6

Truss Design and Details

PART II. TRUSSED BEAMS

By CHARLES L. SHEDD, C.E.

SOMETIMES when wooden beams are desired they are not in themselves strong enough to carry the load safely or it may be that a stick strong enough would be too expensive or difficult to obtain. If there is room, and if the nature of the structure permits, a wooden beam may in such cases be reinforced by rods trussed underneath as indicated in Figs. 5 and 6. In the case of Fig. 5 the rods are bent under a single post placed under the center of the wooden beam. This is known as a king post truss. In longer spans these rods are bent under two vertical posts as shown in Fig. 6. This is known as a queen post truss.

This is the simplest form of wooden truss to construct but the most difficult to design properly. In a truss of the usual form the stresses may be determined by constructing a simple stress diagram, but in the case of a queen or king post truss such a method would be of no use at all and would give results very misleading which might result in considerable trouble if the truss were built without proper investigation of stresses. To understand the action of a truss of this nature the designer must picture how the truss would look when it had deflected under the applied load. It is evident that in order to deflect the wooden top chord must bend in much the same way as it would if it were a simple beam without the truss rods below. The deflection obviously would not be so great. Therefore there still remains, to a certain extent, the same action in the wooden stick as there was before the rods were used but in addition the rods take tension and the posts and wooden beam are in direct compression just as they would be in an ordinary truss. We must then determine how much of the load is carried by the wooden beam as a beam and how much by the truss as a truss. There are certain formulæ by which the deflection of either a truss or a beam under a given load can be determined. In these formulæ the moduli of elasticity of the materials used form an important part. The modulus of elasticity is materially different for wood and steel or iron. If we take the stress in the post as an unknown quantity, we can divide the structure into its two parts. The wooden beam carries the same load as if it were a simple beam and

in addition there is this unknown force being exerted against it in the opposite direction. With these loads the deflection may be determined algebraically in an equation involving the unknown force in the post. Another equation may be formed for the deflection of the truss containing this same unknown quantity and with these two equations, which must equal each other, the amount of this unknown quantity may be determined by simple algebra. In making such an analysis of the truss the designer is making one very important assumption which he must not neglect to appreciate or remember when the truss is erected. This is



Fig. 5



Fig. 6

that he is assuming: first, that there is no deflection in the structure before any load is applied; and second, that the top chord and the truss begin to act simultaneously when the load is applied. It may seem that the first assumption is so absurdly simple and evident that it is no assumption at all, but when we assume that there is no deflection in the structure when there is no load applied it means that the nuts on the rod are not tightened up to such an extent as to cause the wooden stick to buckle up at its center, causing stresses in it and the rods before any load is applied. The second assumption presupposes that the rods are sufficiently tight so that they will begin to act immediately when the load is applied. It may sometimes be desirable to design the structure in such a way that there will be stresses in the members before a load is applied.

The queen post truss involves certain difficulties not encountered in the design of the king post truss. As there are no diagonals in the middle panel it is evident that the stresses in the inclined rods at the ends must be the same and therefore that the stresses in the posts must be equal. This can only be under a symmetrical loading which must be the basis of the design because the queen post truss should be used only in cases where these conditions prevail. In this truss computation the designer writes out equations for the sum

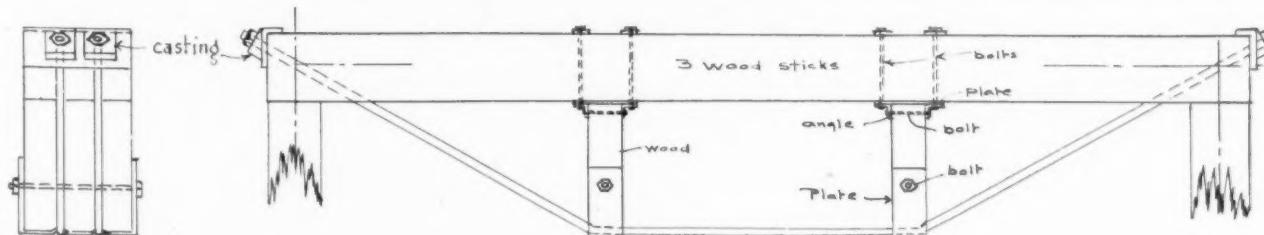


Fig. 7

of the deflections at the two points where the posts occur. These posts may divide the span into three equal parts but this is not necessary nor even, at all times, desirable.

Fig. 7 shows a queen post truss more in detail. The posts are usually made of wood. Between the post and the horizontal stick it is often necessary to place an iron plate. This plate is used in conjunction with two angles and four bolts in order to make a rigid connection. Wood is very much softer in resisting compression across the grain than it is lengthwise of the grain, so if the vertical post were stressed up to its capacity it would overstress the wood of the horizontal stick

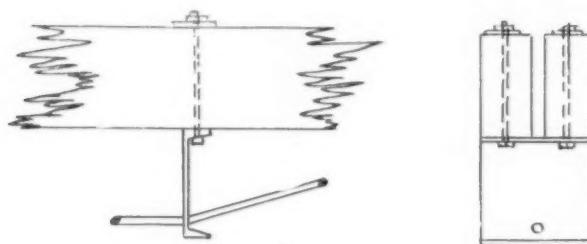


Fig. 8

in bearing, and cut into it. Besides injuring the horizontal stick such action would cause an unnatural deflection in the truss which was not considered in the design. It would not be practical to design a truss to include such a condition and it would further seriously complicate matters.

At the bottom of the posts is shown another plate bent to cover the end and to form a bearing surface for the rods. A direct bearing of a round rod under stress would have a tendency to cut into and split the post. If these plates are bent slightly to form a groove for the rods, the slipping of the rods sideways will be prevented. The bolt through the plate and post serves to hold the plate in position and to keep the post from splitting if the plate bent and dug into the post.

Sometimes the post may be made of cast or wrought iron and in some cases of steel as shown in Fig. 8. At the end of the truss a metal bearing must be provided for the rods against the stick. This may be made of any angle with beveled washers or with a casting. In any event it must be formed of an L shaped piece in order to give bearing against both the top and end of the stick for the two components of the stress in the rods, the horizontal surface for the vertical component and the vertical surface for the horizontal component. These areas will not be proportional to the two components as the allowable stress in bearing on the sides and ends of a stick are materially different as was noted in discussing the bearing of the post against the horizontal stick. In fact it is allowable to use a stress about three times as great for bearing on the end of the fibers as against the sides. It will also be noted that the intersection of the center lines of the horizontal stick and rods is over the center of the bearing.

The end casting should also be thick enough to resist bending as it will act as a beam with stresses in one direction applied by the rods and in the opposite direction applied by the stick. In this particular truss are shown three wooden sticks and two rods alternately placed. It is evident that this arrangement may be varied considerably.

Fig. 8 shows a simple design for a post which has been used by the writer to a considerable extent. It is formed by a short piece of steel channel punched in the web to allow the rods to pass through and in the flange to allow bolts to be introduced which will hold it securely to the wooden stick and assist in preventing it from canting. Such posts, when deep enough, are very cheap as there are always short pieces of channel left over from other work around a shop. A short piece of I beam could also be used.

It is usually desirable to place separators between the wooden sticks forming the top chord. These keep the members in their proper positions and make a substantial and complete structure. They also strengthen the truss against lateral deflection which might be caused in a narrow stick when subjected to too great compression either from bending or from direct pressure. When there is horizontal bending, which is seldom the case, a cast iron separator may be used as shown in Fig. 9 but this is rather more elaborate and expensive than is usually required. An oak block may be used, notched into the main sticks, or even a block of the

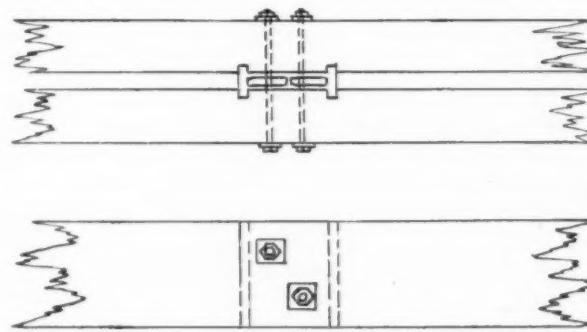


Fig. 9

same material as the sticks depending on the amount of work which the designer expects it to perform.

When the rods are large it is best, in the queen post truss, to introduce a turnbuckle in their horizontal portion. If the rods are small they can be tightened up sufficiently by the nuts at the end unless these nuts are to be covered in. Under such conditions they cannot be tightened conveniently after the structure is built and in case of settlement, due to the seasoning of the timber or to excessive loading, the rods may need taking up. When the turnbuckle is used it is often best to put a horizontal strut between the posts just above the rod. This allows the rods to be tightened without danger of inclining the posts.

Early American Domestic Architecture

IV. THE JESSUP HOUSE, WESTPORT, CONN. MEASURED DRAWINGS BY OLIVER REAGAN

EIGHTEENTH century New England builders were successful in obtaining surprising results with a limited number of the simplest motifs. The old houses in the lower part of Connecticut, for example, show the use of only a few types, but within these narrow and restricted limits the old designers—many of them carpenter-builders—produced buildings of great interest, which are as beautiful today as when they were first built.

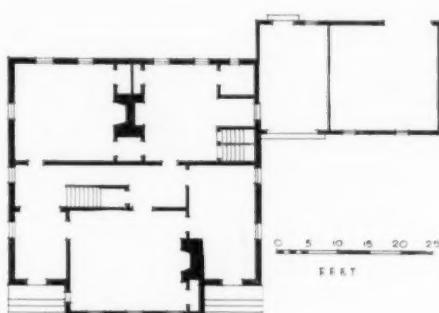
Occasionally, however, the builder departed somewhat from a strict following of any one of the few forms of building which were in vogue. The Jessup house, at Westport, built about 1780, affords an instance where the designer varied considerably from the use of any of the accepted types. He seems to have felt the need of symmetry, nevertheless, and the form of the house, while irregular, retains a certain degree of definite, formal balance.

Here the house has a gable end at the center of

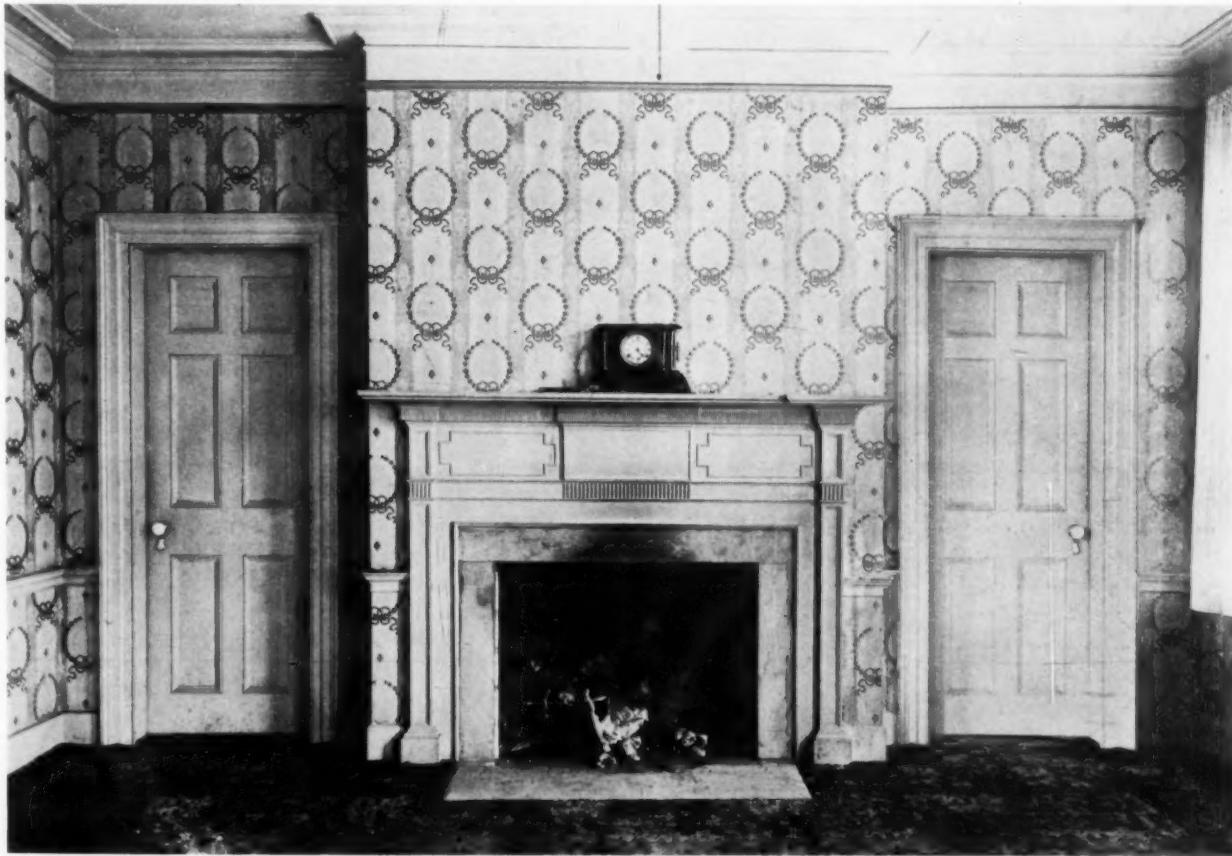
the building which is flanked at either side by an abbreviated wing with a hip roof. While there are two entrances neither one is placed in the gable end of the house but one in each of the wings. The designer has made the doors very simple and restrained that they might detract in no wise from the architectural interest and decorative importance of the central gable end.

The slenderness of the engaged wooden columns emphasizes their purely decorative function and the bases of the columns, the sunken arches over the lower floor windows and the semicircular panels which they enclose—plain surfaces made of flush boards—illustrate the manner in which

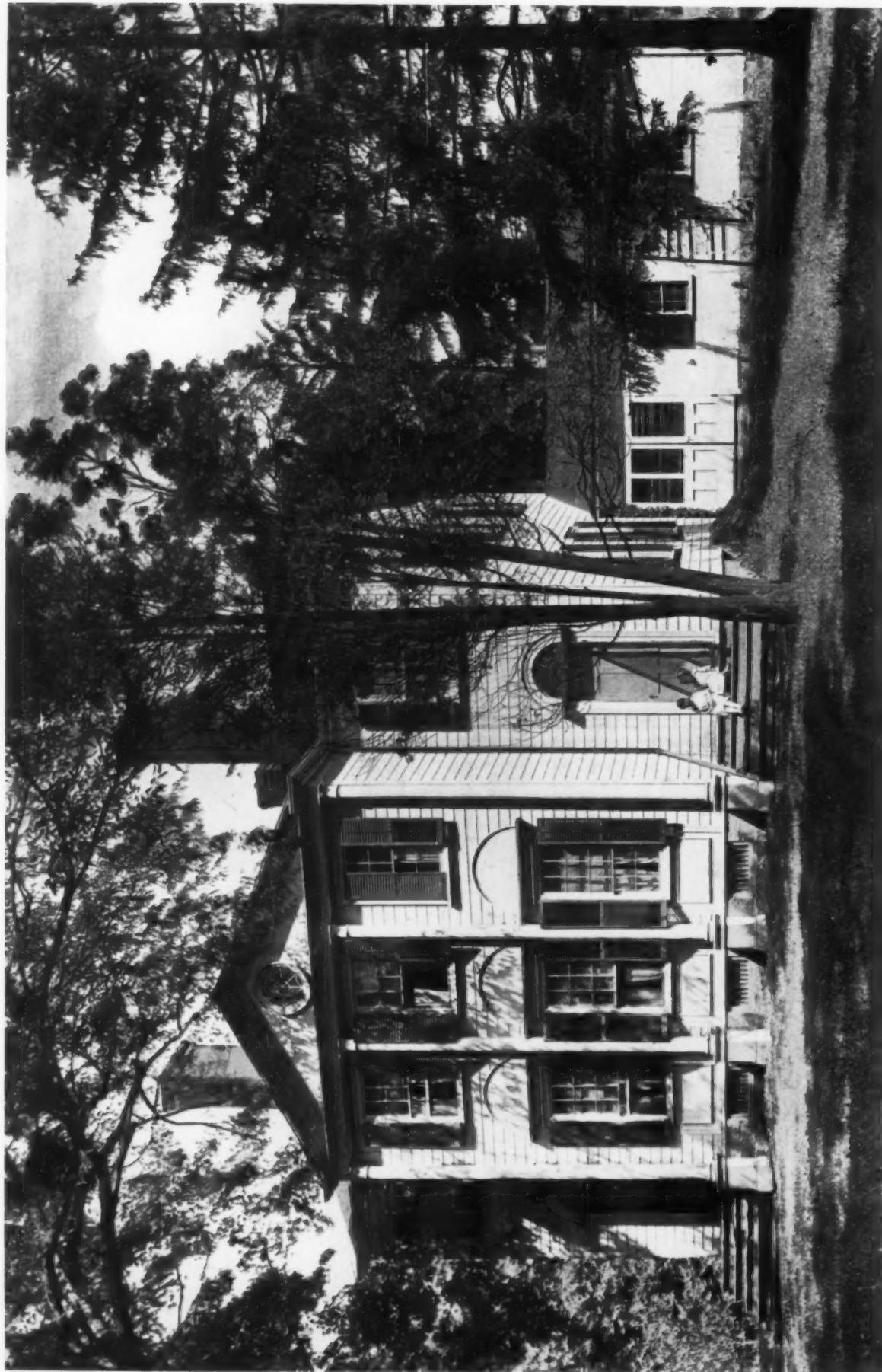
architects of the period adapted to wood construction forms usually identified with the use of stone or brick. These houses depended for their beauty upon two things: proportions carefully studied and excellent detail very sparingly and thoughtfully used, which produced an effect of dignified simplicity.



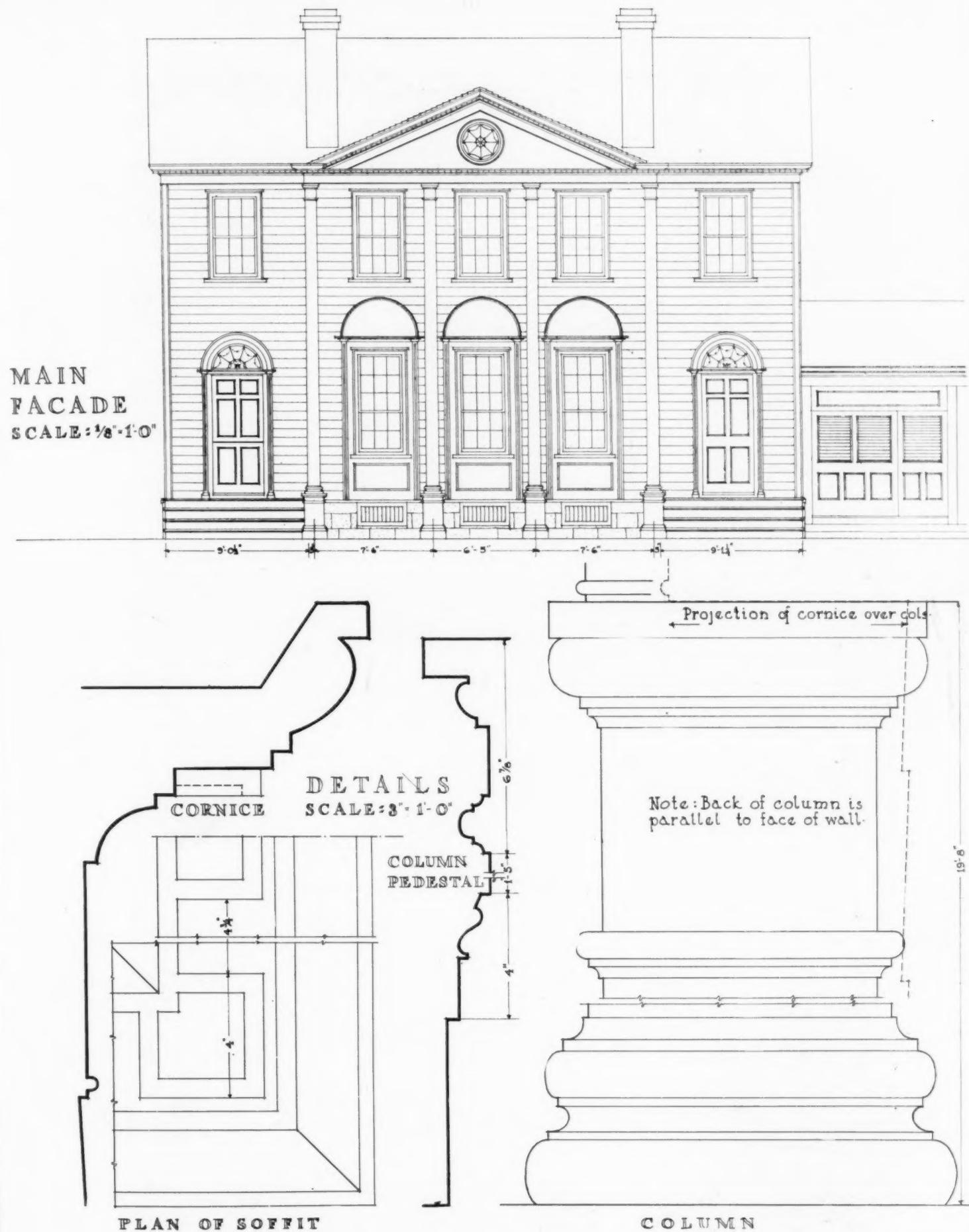
Plan of Main Floor



Detail of Principal Room or Parlor

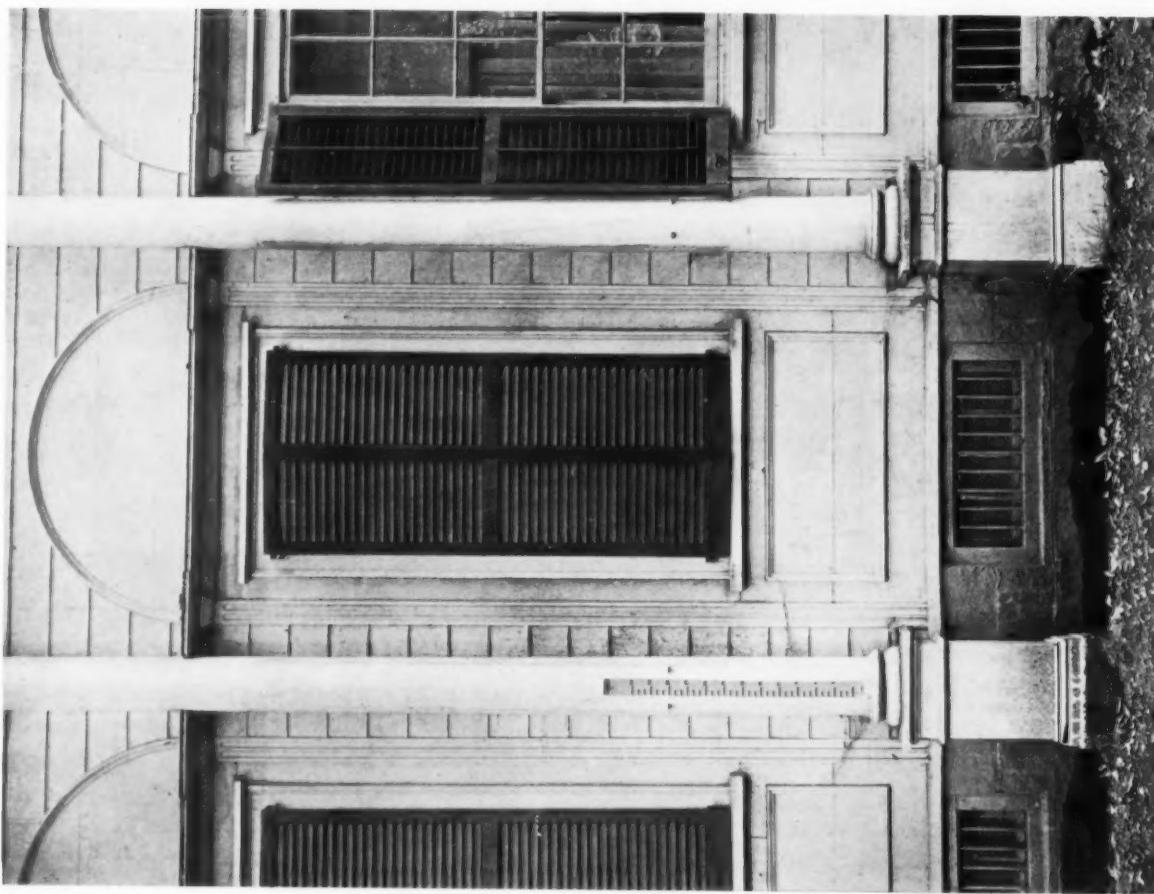


VIEW OF MAIN FRONT. THE JESSUP HOUSE, WESTPORT, CONN.



THE JESSUP HOUSE, WESTPORT, CONN.

MEASURED AND DRAWN BY OLIVER REAGAN

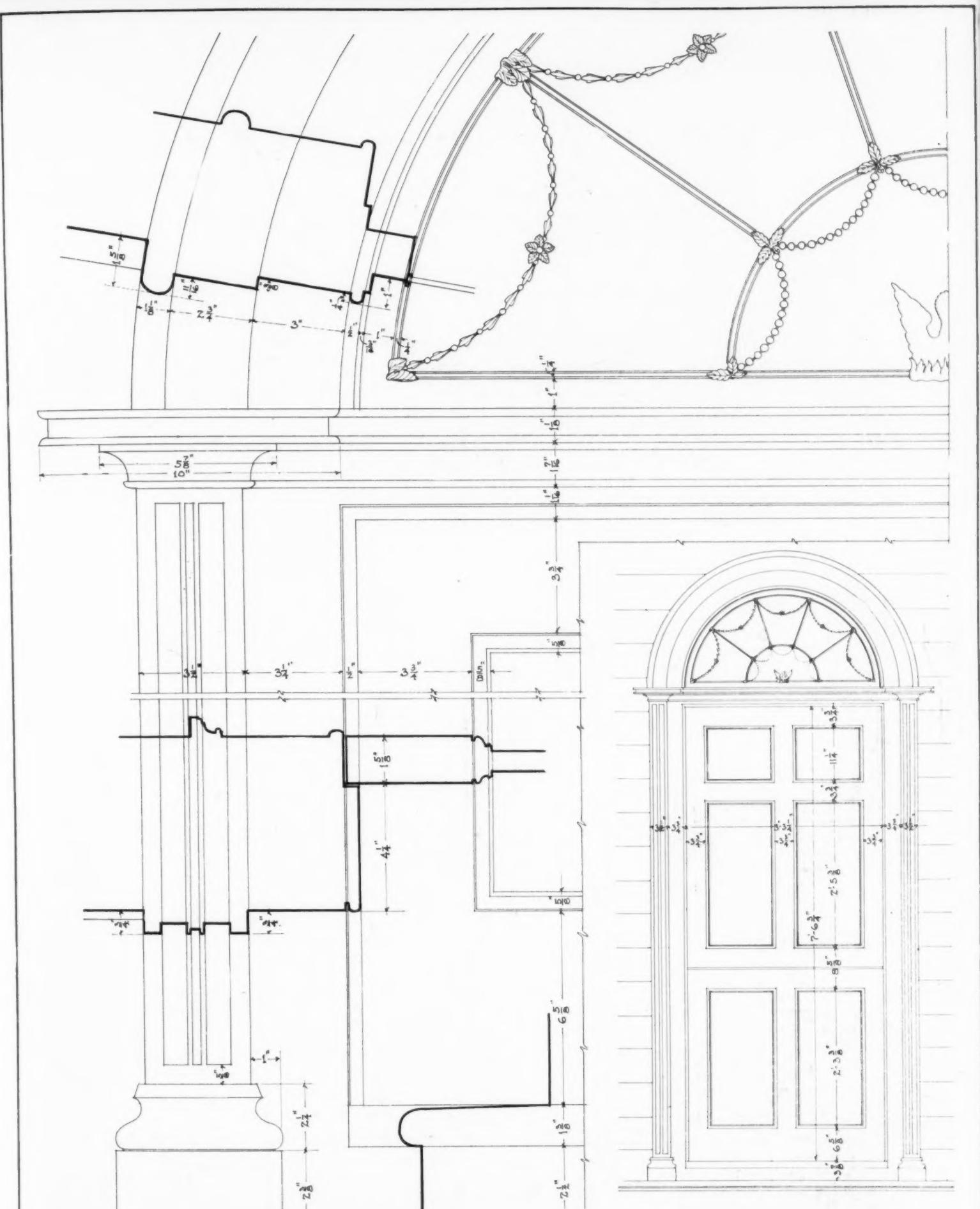


DETAIL OF LOWER STORY



DETAIL OF ENTRANCE FRONT

THE JESSUP HOUSE, WESTPORT, CONN.

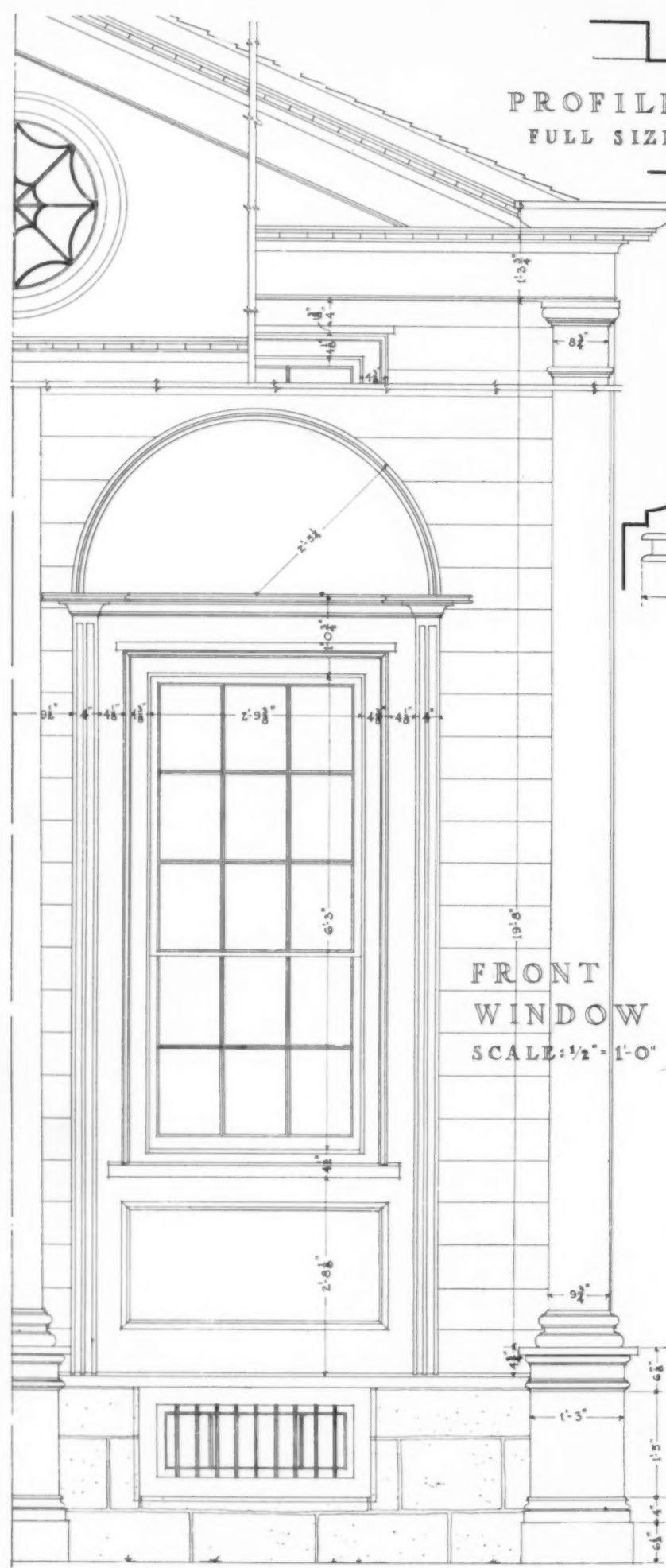


DETAIL
SCALE: 3" TO 1'-0"

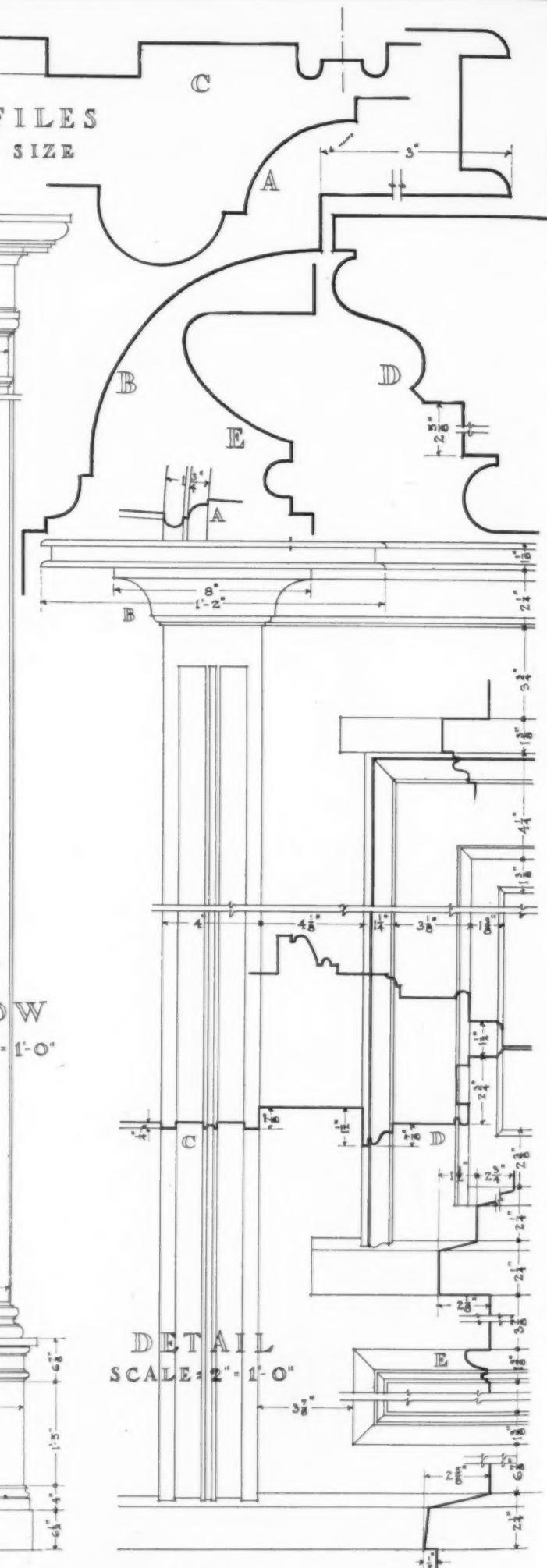
FRONT ENTRANCE
SCALE: 1/2" TO 1'-0"

THE JESSUP HOUSE, WESTPORT, CONN.

MEASURED AND DRAWN BY OLIVER REAGAN

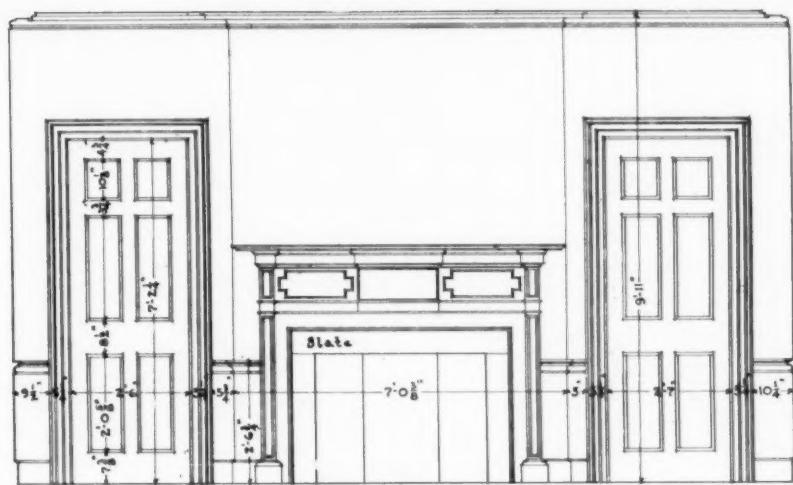


PROFILES
FULL SIZE

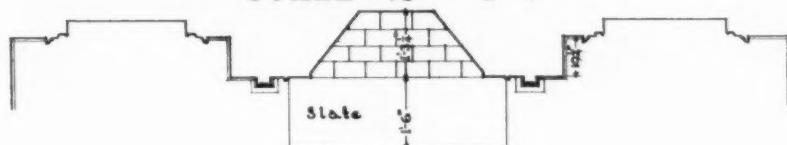


THE JESSUP HOUSE, WESTPORT, CONN.

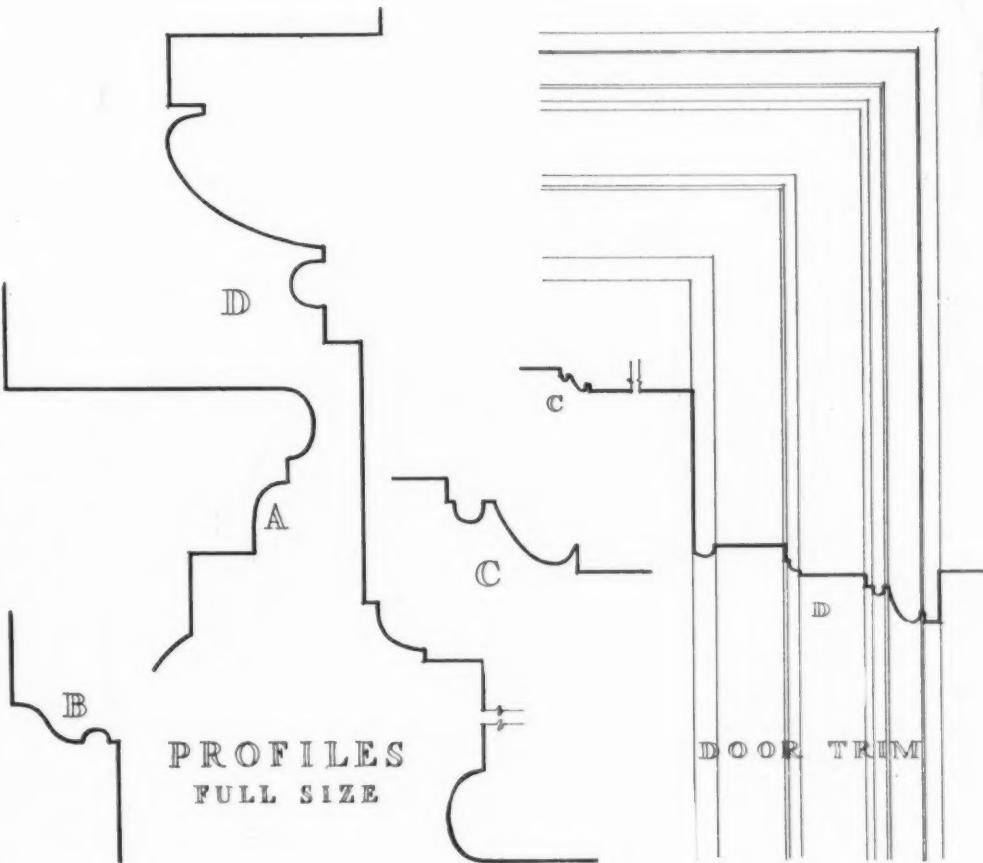
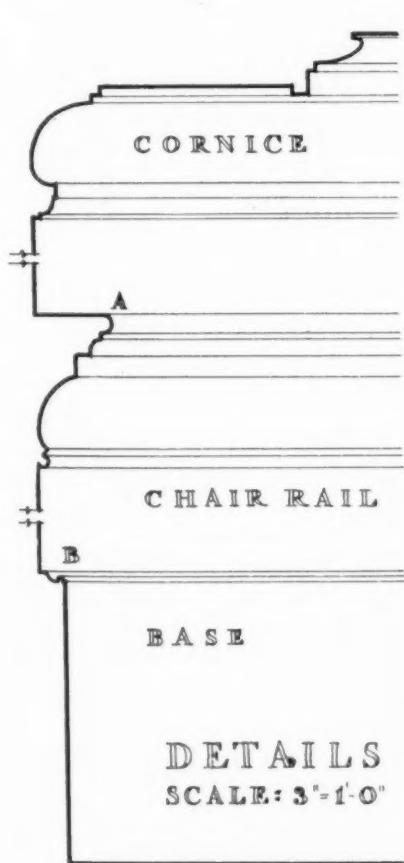
MEASURED AND DRAWN BY OLIVER REAGAN



PARLOR
SCALE: $\frac{1}{4}$ " = 1'-0"

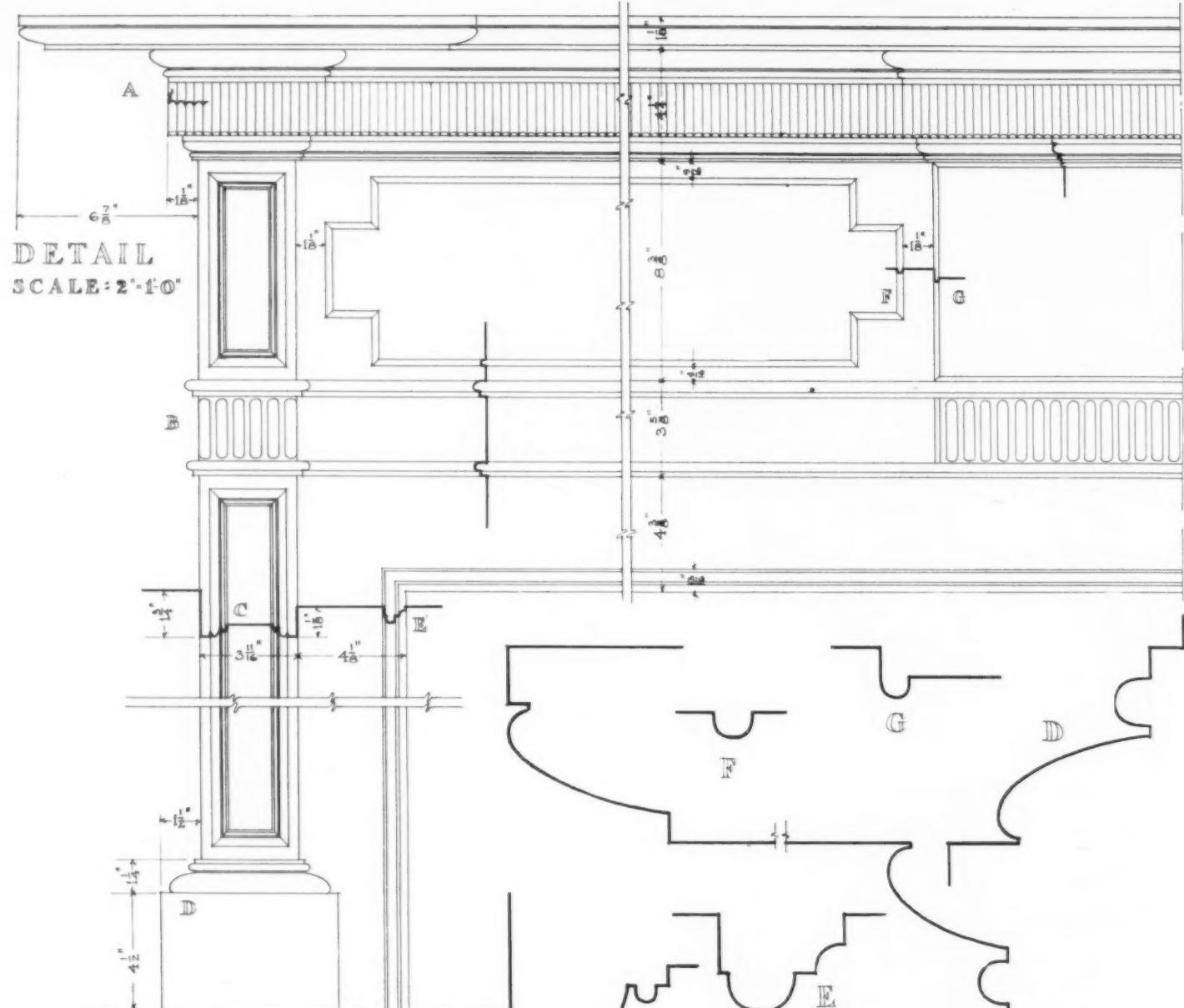


PLAN

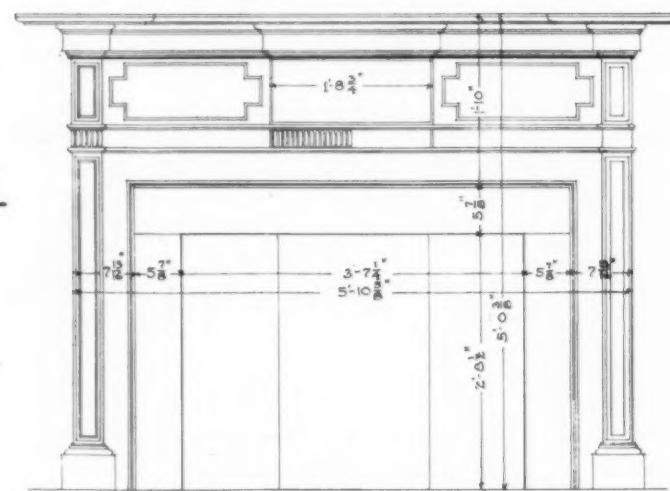


THE JESSUP HOUSE, WESTPORT, CONN.

MEASURED AND DRAWN BY OLIVER REAGAN



PROFILES
FULL SIZE



THE JESSUP HOUSE, WESTPORT, CONN.

MEASURED AND DRAWN BY OLIVER REAGAN

ARCHITECTURAL & BUILDING ECONOMICS DEPARTMENT

C. STANLEY TAYLOR, *Associate Editor*

The Placing of a Cost-Plus Building Contract

PART II. RELATIONS OF ARCHITECT AND CONTRACTOR WHILE WORK IS UNDER WAY

IN the November issue of THE FORUM, under this heading, the question of a form of contract was discussed. It is assumed that the type of cost-plus contract under which the average work will be carried out will not be other than that known as the fixed-fee contract or fixed-fee with penalty and bonus clause. At this point an analysis of the difference in relationship between the architect and contractor under the lump-sum and fixed-fee types of contract will prove of interest as having a bearing upon the type of organization and method of supervision necessary from the architect's standpoint.

While it is true that a lump-sum contract apparently removes responsibility as far as ultimate cost of the building is concerned, this is not often the case. In the first place, in any large building operation there will of necessity occur certain changes in plan, corrections of omissions and other details which may legitimately be classed as extras by the contractor. The total cost of these extras cannot well be estimated and it is a well known fact that practically all lump-sum bids have definitely in view the possibility of extras on which the contractor will receive a percentage.

From the very beginning of a lump-sum contract, therefore, even with the most reputable contracting firm, there is a constant actual or potential state of friction between the architect and the contractor. The interpretation of specifications offers many points of disagreement, and delays on the job which may not be the fault of the contractor are often not readily understood by the architect. In many instances the architect is called upon to arbitrate between the sub-contractor and the contractor. If, for some reason, the contractor may fail to approve a sub-contractor's work or fail in payments to him, a lien is placed upon the building. In other words, when a contract is placed upon a lump-sum basis the architect and contractor are not working in harmony for the benefit of the owner. The contractor is working for his own benefit, to protect his own factor of profit in the figure which he has quoted as the total cost.

The architect, under the straight contract, is not getting the benefit of close co-operation with the contractor. Consequently he is placed in a position where he must watch out not only for the quality of construction, and of materials, but he is in addition working with an unknown quantity as far as the contractor's attitude may be concerned. He has no careful cost record available. He is not certain at what point the contractor may

be in danger of losing money—a time when the natural force of self-protection may develop an acute crisis in the relations of the contractor, the architect and the owner.

One of the definite penalties of the lump-sum contract, which has involved considerable loss to owners, is the element of time. While a time of completion may be set in the contract there are many loopholes, and—judging by the average case of this kind—when the contractor reaches a point where he sees no profit in the job he will not exert himself to finish the work rapidly.

There are many other obvious and familiar points of disadvantage in connection with a lump-sum form of contract on large operations, particularly under unusual material price and labor conditions. (The statements made here are relative to large projects only and do not constitute an indictment of the general contractor but of the lump-sum method of letting contracts on large work.)

On the other hand, the relationship which is developed under the fixed-fee form of contract is one which should tend directly to the benefit of the owner. Under any given set of conditions affecting a building operation it is evident that there is a minimum cost from the owner's point of view. The question is—how can this minimum cost be most nearly approached in actual figures? It is logical to believe that the most satisfactory method might be:

1—That an architect be selected and sketch plans drawn and approved.

2—That before going into working drawings and details, a decision be made as to the form of contract under which the building will be constructed.

3—That if it is decided to take advantage of a fixed-fee form of contract, a contracting organization be selected in order that an experienced contractor may be available to the architect in the course of preparing working drawings, details and specifications.

4—That when building operations have commenced the architect and contractor will ally their efforts, each in his own organization, to buy materials and equipment at the lowest possible market prices, to arrange sub-contracts in a manner mutually satisfactory for the owner's benefit and to carry out and expedite the work with integrity.

Certainly, many architectural offices are so completely organized in personnel and departments that they have no particular need of the advice of the general contractor in the course of developing plans and specifications. On the other hand, we

may frankly say that many large building operations have been planned under conditions where the practical advice of a good general contractor would have resulted in the saving of considerable money for the owner. It is interesting to note that B. W. Morris, architect of the Cunard Building in New York, in describing the architectural development of that building in *THE FORUM* for July, 1920, said: "It is the writer's experience that the best possible results are secured when the builder, experienced, competent and honest, is appointed at the same time as the architect."

Turn now to the actual relations between the architect and the contractor. As the work proceeds under a cost-plus-fixed-fee contract, we may consider for a moment the inter-related functioning of the two organizations. The contractor is directly charged with the purchasing of materials according to specifications, the hiring of labor, the direction of work in the field and, usually, the provision of necessary construction equipment, probably on a rental basis. The architect is called upon to approve purchase orders for materials and equipment, to check the progress of work from the view point of elapsed time as compared to estimated time,* to inspect the quality of work, to approve any sub-contracts which may be placed and, in brief, to consider himself in the position of the man who is investing money in this building. That the relations of the architect and the contractor may be harmonious is practically guaranteed by the fact that they are working for a common purpose—the benefit of the owner.

It will be seen, therefore, that the architect's organization should include a field superintendent (usually an engineer) who will act as the architect's representative, and who is on the job not to act against the contractor's interests but to aid in every possible way with practical suggestions during the progress of the work. On a job, this resident engineer will probably need an assistant who, as a general utility man, will develop progress reports and act as expeditor and follow-up man where there may be delays in the delivery of material. In the architect's office there should be an estimator who has had considerable experience in purchasing. As purchase orders for requirements may be brought in by the contractor it is the duty of this man not only to check prices but to offer any suggestions which he may have in regard to materials available for quicker delivery or at lower cost. On the job progress records will be kept by the contractor and in duplicate form by the resident engineer representing the architect, so that a cost and time check may be kept and additional pressure put upon portions of the work which may be behind.

It will be seen, therefore, that the architect, through the members of his organization, should have a thorough knowledge of available materials, equipment and methods; that he should have in his

organization capable resident engineers, estimators and experienced purchasers. The contribution of the architect to the success of a building is:

1—In designing a building which is efficient in purpose and economical from the view point of building cost.

2—To be able to check the work as it progresses in order to offer constructive suggestions and assistance.

3—A readiness in understanding the view point of the practical builder, in order that changes in details or specifications may be made quickly to meet any unusual condition which may arise.

Under the fixed-fee contract, a contractor has not even a theoretical reason for increasing cost or delay, but has every incentive to carry out his work in a manner which will bring strong approval and recommendation from the owner. While the architect is not relieved of any responsibility under this method of contract, he takes on only the additional responsibility which is represented by a more intimate knowledge of the building business—knowledge entirely desirable from his view point.

It is important to realize, however, that the architect, under the fixed-fee type of contract, where relations are developed with a reputable organization, avoids the unpleasant type of supervision which is involved in the case of the lump-sum contract. In other words, under the straight contract the architect and contractor usually develop into the position of "friendly enemies" because the actual interests of both are so distinctly separated. It is well to realize also that during past years there have developed certain contracting organizations which are highly professional in their method of rendering service. Skilled in the difficult details of hiring and superintending labor, equipped in personnel with experienced engineers and field superintendents and having behind them a long list of satisfactory contracts carried out for owners on a service rather than on a lump-sum basis—such organizations are quite similar to architectural organizations in their professional relations with the owner or his representative.

It is evident, therefore, that an architect who, in conjunction with the owner, is about to place a building contract, has his choice of two types. One is a straight contract in which he asks the contractor to buy quantities of material and necessary labor, combine them and sell to him the total result for a definitely estimated and guaranteed price. Unfortunately he cannot see the article which he is purchasing and it may be that the buy will be a good one or a bad one—in accordance not only with the purchase price but with the varying fortunes of the building contractor who makes a definite bid involving many conditions beyond his control. On the other hand, the architect may purchase for the owner the service of an organization which he may analyze by its performance, by its personnel and by the integrity of its approach in developing business relations with him.

* See articles, "Progress Schedules," by C. A. Whittemore, *THE ARCHITECTURAL FORUM*, Jan.-Apr., incl., 1916.

Sound Reasons for Optimism

THE fundamental business conditions of the United States are of direct interest to architects and all other business men in the construction industry. We have had many indications of troubled business conditions, such as the falling of prices in many commodity lines, a slowing down of interest in building construction, and similar effects of present unsettled conditions. It is interesting and encouraging, therefore, to consider a recent statement by Charles H. Sabin, President of the Guaranty Trust Co. Every architect should read this statement carefully and give it due importance in his consideration of future business conditions:

"There are some important considerations which should be borne in mind in the present situation by all who seek to analyze it accurately.

"In the first place, there is nothing mysterious or unexpected about the present condition in either the commodity or security markets. For months it has been certain, and it has been repeatedly so stated by students of the situation, that there must be a liquidation of commodities, securities and labor before this country could fully recover from the effects of the war and be restored to anything like a normal business basis. It was inevitable that the processes of readjustment should be painful in many respects and in many instances, but that they were and are inevitable was a matter of common knowledge among all who seek to study these problems apart from immediate self-interest. The regrettable thing is that, as commodity and security prices reached points far above their real value in the boom period, so they are today falling to points far below their real value. Necessary liquidation is proceeding after the manner anticipated, on the whole, but there are yet several steps to be taken.

"Perhaps the most important of these is for retail merchants to realize that they too must meet the inevitable economic trend and adjust their prices to meet new conditions. Only in that manner can the situation be stabilized and frozen credits thawed out. I know this is not a pleasant message, but I am firmly convinced that the sooner such a policy is pursued, the less costly and painful it will be to all concerned. The process of deflation must include all the elements in the body economic sooner or later and there can be no escape from the inexorable law which directs it. Dodging the facts or attempting to postpone the inevitable will not bring immunity to anyone, whether his interest lies in production or distribution, capital or labor.

"The unfortunate effect in such a situation is always that many innocent parties are made to suffer through ignorance and misunderstandings and also through the spread of false and malicious rumors which such conditions always inspire, with a resulting loss of confidence and panic sales.

"There is so much in the present situation to inspire confidence and hope for the future that it is little short of criminal for anyone to paint the picture so blackly, through either ignorance or intent, that these vital facts are obscured. There are many pertinent facts. This country has harvested this year one of the largest crops in its history; its transportation congestion has been relieved and its railroad system is for the first time in a decade on a sound financial and operating basis. We have passed through a national election and are assured four years of sane administration of public affairs. Our banking system has withstood the greatest credit strain in its history and is on a sound and workable basis; the accumulated surplus of five years of splendid prosperity is stored in many ways for our continued use; the markets of the world demand our products and a great mercantile marine is prepared to transport them. This country has not been overbuilt or overextended in any of its underlying activities, and faces no program of readjustment along these lines such as usually precipitates panic conditions. We are in a sounder financial, industrial and political condition than any important nation in the world.

"These are the simple, fundamental facts of our business situation, and to consider the present reaction as anything but a temporary setback from the destruction, inflation, extravagance and unsound economic conditions precipitated by the war is simply not to reckon with the truth. It remains true today, as it has since this country was first settled, that any man who sells the United States of America 'short' is in the long run certain to lose and, furthermore, any man who seeks to profit by the misfortunes of others in the circulation of mis-statements or false rumors, hoping to precipitate further reactions, should be branded as a public enemy.

"This is a time for clear thinking and courageous acting, and in the proportion that such factors are brought to bear will rewards follow when this spell of reaction has run its course."

It is of course difficult to analyze to any satisfactory degree the activity which may be expected in the building construction industry during the next year. In considering this question, however, there are certain fundamental conditions which may have definite significance and from which we can draw certain conclusions. These are:

1—That the shortage in building construction, to reach again a normal supply, represents an expenditure of approximately \$4,500,000,000.

2—That the approximate expenditure required normally is close to \$1,000,000,000 annually.

3—That with index price of the bond market rising, and in view of the withdrawal from the market of many attractive investment issues, there

is a definite tendency on the part of the public to turn again to real estate mortgages as a sound form of investment.

4—That architects everywhere are reporting a slight increase in business and that all conditions indicate that 1921 will prove an active year and the first year of extended building activity.

5—That the classes of building in which greatest activity is expected are:

(a) Housing of every type, including dwellings and apartment houses—a large proportion of the expenditure to go into apartment house construction.

(b) Office structures and various utility buildings.

(c) Buildings for educational, amusement and similar enterprises.

You ask directly regarding the effect on business of low crop, raw material and commodity value conditions. The effect of these conditions on the building industry may be readily approximated.

The present inactivity in the building field is largely due to the fact that the public confuses building materials with commodities such as woolen goods, cotton goods, silk, shoes, etc. Having seen a definite price reduction in these fields, the public expects to see the same thing happen in the building industry. It cannot happen to a similar extent, however, for the reasons that there are no supplies

of building materials on hand and that the building material field has not yet definitely felt the general labor reduction.

Undoubtedly, building material prices will stabilize on lower levels than heretofore but not as low as present prices. This is evidenced by the present inclination of dealers not to accept orders calling for definite future delivery dates that run beyond February or March, 1921. We find from many architects' offices that they have been advised to hold up plans until next spring to see what happens in the material market. When it is found that there is no great reduction in prices a large volume of work will proceed. It is true that there will probably be a reduced labor cost in actual construction but this will tend only to increase the volume of business.

If we consider these facts along with the growing inclination to invest in building loans and real estate mortgages, it is evident that we may safely anticipate a period of several years' activity in our industry. The first activity as shown next spring we are certain will be a definite attempt to meet the present shortage in building loans and the force of economic conditions tending toward a lowering of prices will re-enforce this activity to maintain at least its normal stage with some attempt to take up the slack.

The Question of Standardizing Building Codes

WE are interested in hearing from architects in every section of the country regarding the question of building code standardization. We have had several letters on this subject recently, among them being one from a Buffalo architect from which we quote briefly:

"I am interested in 'high cost of building.' One way to lower the cost is to revise our building laws; for instance, the live load in an apartment house in Milwaukee is 30 pounds to a square foot. The Buffalo requirement is 70 pounds to a square foot—more than twice. Why should that be? As regards live loads for various buildings, the requirements should be uniform. This is a subject I would like to see taken up in THE FORUM."

Our correspondent has touched upon a subject which is of great importance not only to architects but to contractors and building material manufacturers. There is no doubt that the general requirements of the average building code have not been scientifically determined. Very often these requirements necessitate an excess expenditure in certain classes of buildings which is frequently as high as 30 per cent.

Building laws and building codes are necessary in order to insure public safety and to safeguard loaning interests. On the other hand, it is not logical to find so great a variance in the requirements enforced in various cities of approximately

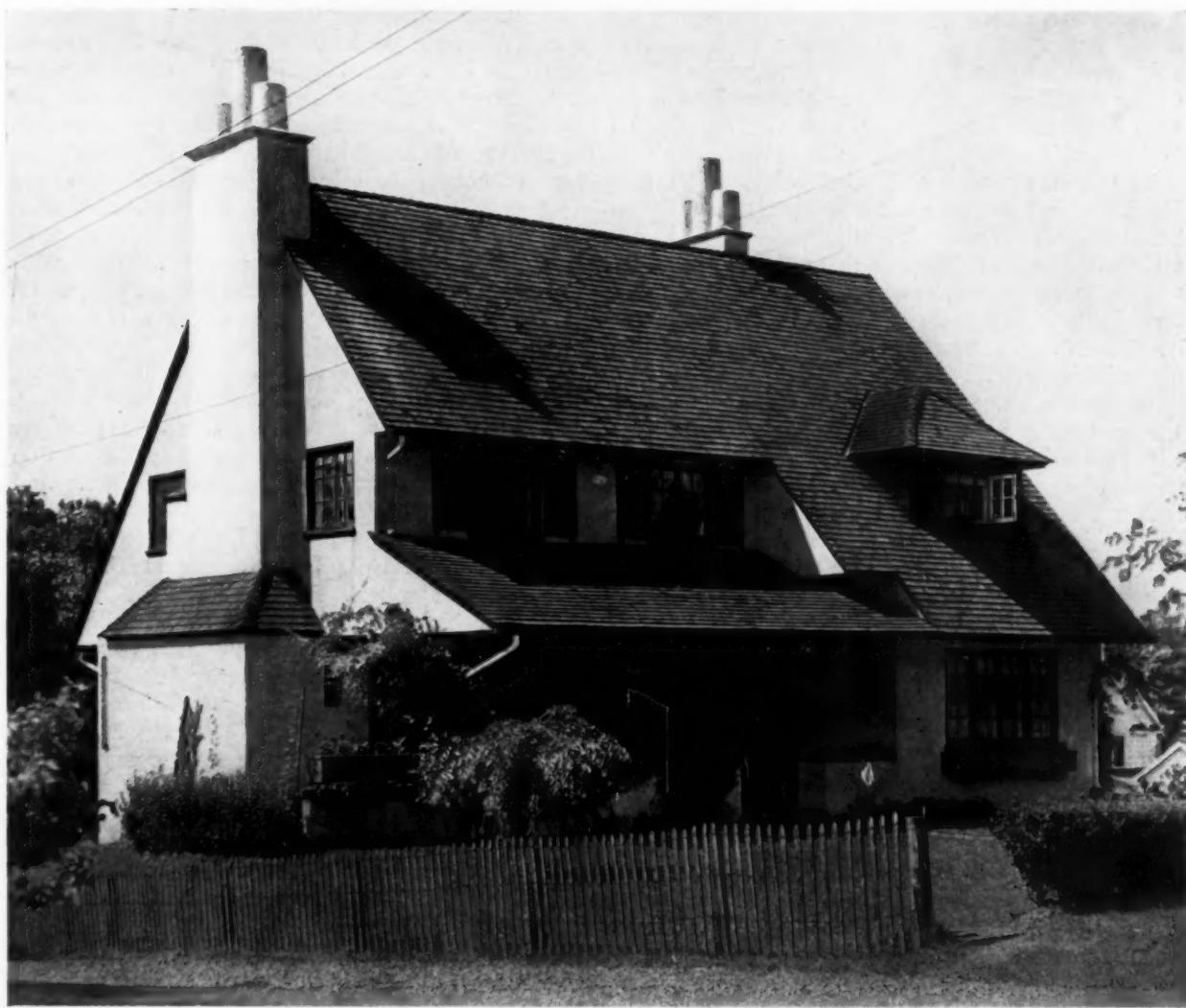
equal population. Certainly there must be many requirements in building codes having distinctly local application, but it seems entirely possible that a standard code can be developed which would have application according to the population grading of cities and it could be used as the nucleus for the development of all local codes. This would mean that the writing of such a code would be based upon engineering knowledge rather than on political preference, and that in many instances the amount of money necessary to invest in building construction would be noticeably reduced per cubic foot, a condition which will be highly desirable during the next few years.

The need of standardization of building codes was recognized some years ago by the insurance interests and a standard for large cities and for towns was developed by the National Board of Fire Underwriters stressing, of course, the protective measures from an insurance view point.

Practically all architects who have been called upon to design large structures, and particularly those whose work has extended to other cities, have had unpleasant experiences in connection with building law and code regulations. We would appreciate letters from architects who have had such experience in order that a definite basis for further consideration of this matter may be established.

A Small English Country House at Hartsdale, N. Y.

CARETTO & FORSTER, ARCHITECTS



FIRST AND SECOND FLOOR PLANS

EDITORIAL COMMENT

JOINT REGISTRATION LAWS

CONSIDERABLE confusion has existed with reference to the form of state registration laws for architects since the adoption of the Institute's model law by the 52d Convention in 1919, due primarily to objections raised by engineers to one of the articles which they maintain would prevent their designing buildings even under the appellation "engineer."

The meeting of the Council of Architectural Registration Boards held November 18 and 19 in St. Louis brings the matter to the fore again and, owing to the fact that the respective interests of architects and engineers in registration laws will be considered at the next Institute convention, the comments expressed at the St. Louis meeting have a special interest.

In the first place, and for the purpose of recalling the progress of recent events, it may be stated that the contention of the engineers represents a misconception of the Institute's recommendation—it is not the intention of the model law to confine the preparation of drawings and specifications for the construction of buildings or of their superintendence to architects; it only denies the right to use the title "architect" in any form to anyone not recognized as an architect by the state. An ambiguity in the phrasing of the article undoubtedly gave rise to these objections and we understand that the present Institute Committee on Registration Laws has redrafted the section to express more clearly the intention of the Institute.

The effect of the opposition, however, resulted in a joint registration law prepared by a committee of Engineering Council. In view of the objection to joint laws voiced at the 52d Convention a conference with the Engineering Council committee was sought and a joint committee of the two bodies resulted, the architect members of which are Ernest J. Russell, Wm. P. Bannister and John Donaldson. This committee held meetings this fall and agreed upon a form for a joint registration law which is now on the press. Approval of the committee's work was obtained of Engineering Council but, due to the expressed opposition to joint laws by the Institute in convention, the report is referred to the regular Institute Committee on Registration Laws which will bring it before the next convention for final action on the part of architects.

The Council of Architectural Registration Boards is composed of officers of the registration boards of most of the states which now have registration or licensing laws. The estimate of these men of the worth of joint laws, therefore, holds weight because it is based on actual experience. It is interesting to note that all present, including a number from states having joint laws, expressed themselves as opposed to joint registration.

The directors of the departments of registration of the states of Illinois and Idaho who perform the executive secretarial work in their states for the

Boards of Examiners of doctors, dentists, nurses, pharmacists, engineers, architects, etc., expressed decided views against joint laws. They gave as their opinion that if registration were placed under the jurisdiction of the departments of education of the states, as in the states of New York and Illinois, separate laws may be fully as economically administered as joint laws and that they, further, are more easily supported and enforced by the courts.

Economical administration of the law should not be a governing consideration because in a matter so vital to the welfare of the public small economies have no importance. As a matter of fact such economy would undoubtedly only be noticeable in those states in which there are few architects and engineers, and the proposed joint law defeats to some extent any possible economy by requiring seven to nine members—three or four architects, the same number of engineers and one surveyor.

The result of the discussion of this subject by the Council was the passage of a resolution "that a joint registration law for architects and engineers is undesirable."

The Board of Directors of the Institute met also in St. Louis on the day following the meeting of the Registration Council. Every member of the board expressed himself in favor of the friendliest co-operation with the engineering profession, especially in obtaining harmonious separate laws that will permit both professions to practice without interference.

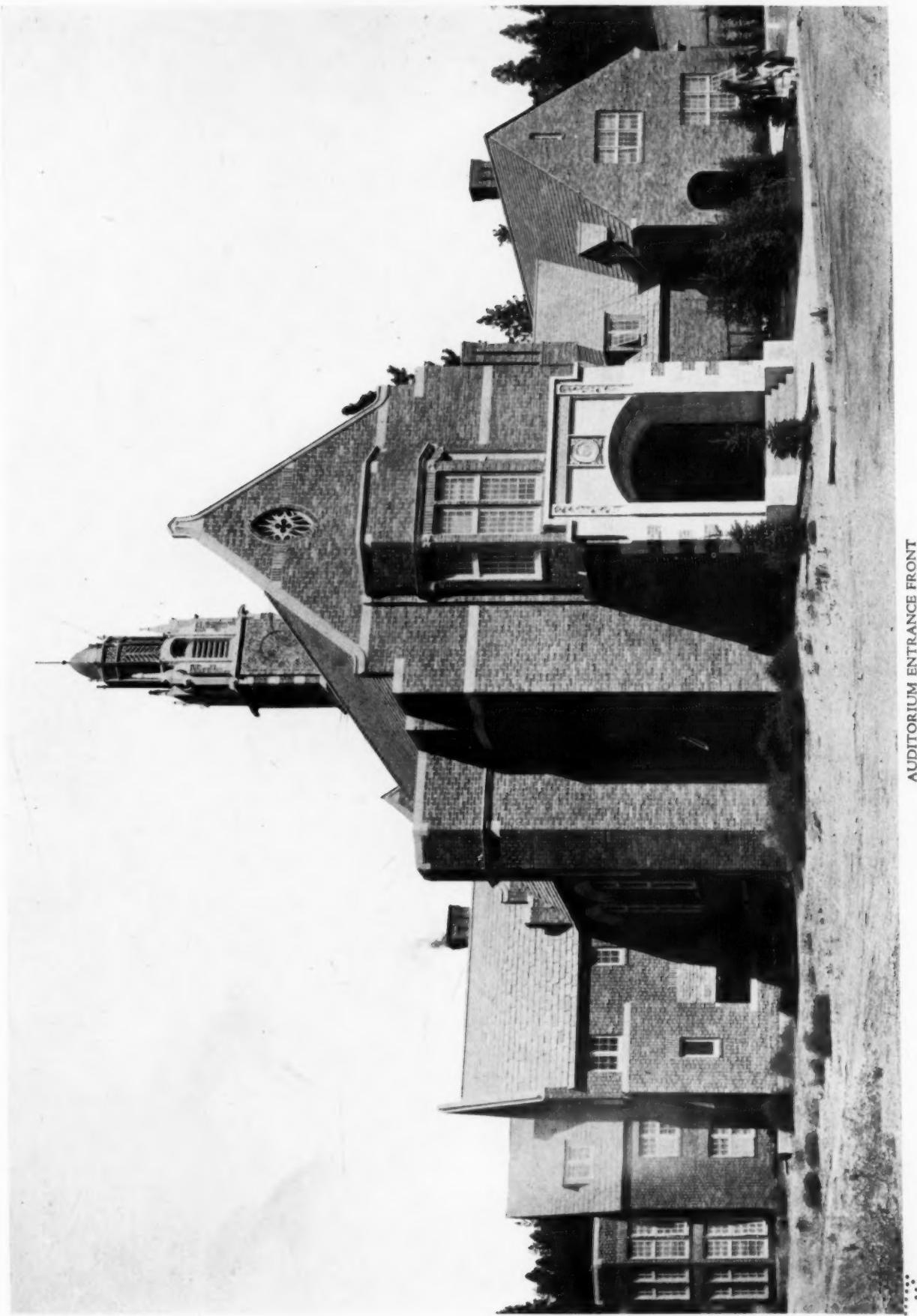
This is the attitude that careful consideration seems to dictate as the most intelligent and most certain of insuring fairness to both professions. While the work of the professions to a certain extent lies along similar lines, and in fact frequently overlaps, there are important fundamental differences in the training for the respective professions that make it difficult to establish one set of conditions that will fairly govern both. There is, however, every reason why a very real co-operation should exist between the professions and especially in the matter of legislation affecting them; this co-operation will be most effective, however, when directed toward establishing a correct understanding of their mutual aims and functions, and on that basis there will be no difficulty in adopting separate registration laws that will insure harmony and fairness.

A necessary further step in registration is uniform regulations which will permit of reciprocity between states, now only possible to a small extent and by virtue of the latitude invested in the examining boards in conducting examinations. The existence of the Council of Registration Boards should be an influence in improving this condition and it will undoubtedly be able to devise a standard examination. In this connection it may be noted that a similar body of the state engineering examiners was formed in Chicago on November 8 and 9 and named the National Council of State Boards of Engineering Examiners.

DECEMBER, 1920

THE ARCHITECTURAL FORUM

PLATE 81



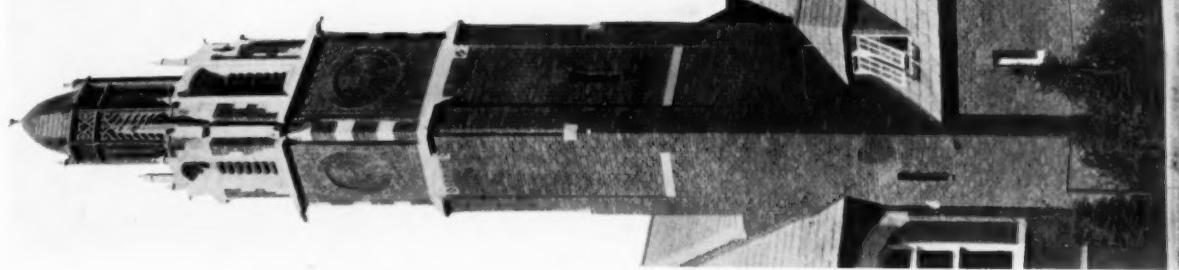
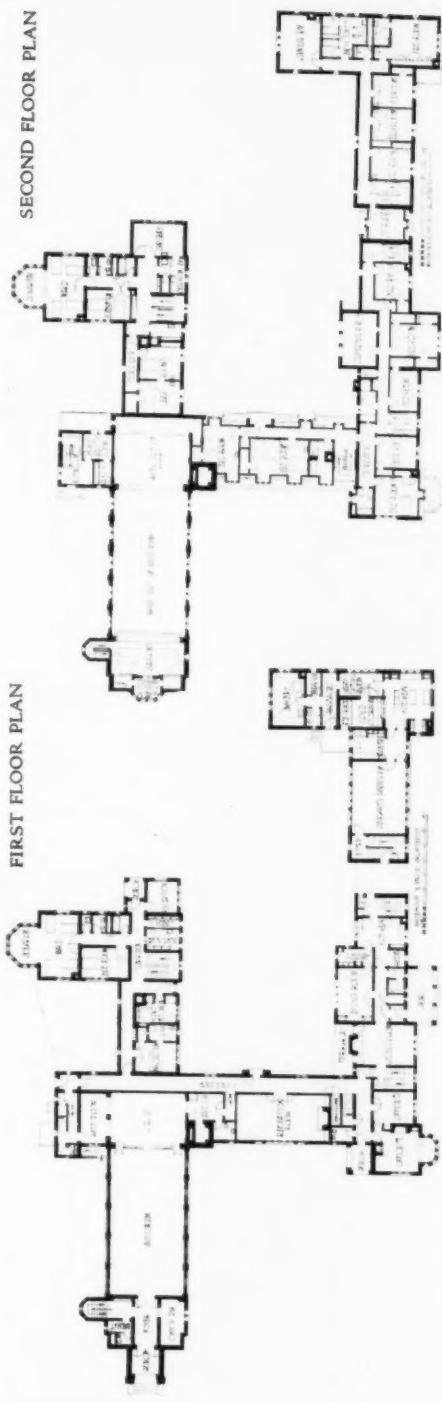
AUDITORIUM ENTRANCE FRONT
HUTTON SETTLEMENT, SPOKANE, WASH.
WHITEHOUSE & PRICE, ARCHITECTS

DECEMBER, 1920

THE ARCHITECTURAL FORUM

PLATE 82

FIRST FLOOR PLAN
SECOND FLOOR PLAN



∠ HUTTON SETTLEMENT, SPOKANE, WASH.
WHITEHOUSE & PRICE, ARCHITECTS

DECEMBER, 1920

THE ARCHITECTURAL FORUM

PLATE 83



COTTAGE NUMBER TWO



COTTAGE NUMBER ONE

HUTTON SETTLEMENT, SPOKANE, WASH.

WHITEHOUSE & PRICE, ARCHITECTS

100

DECEMBER, 1920

THE ARCHITECTURAL FORUM

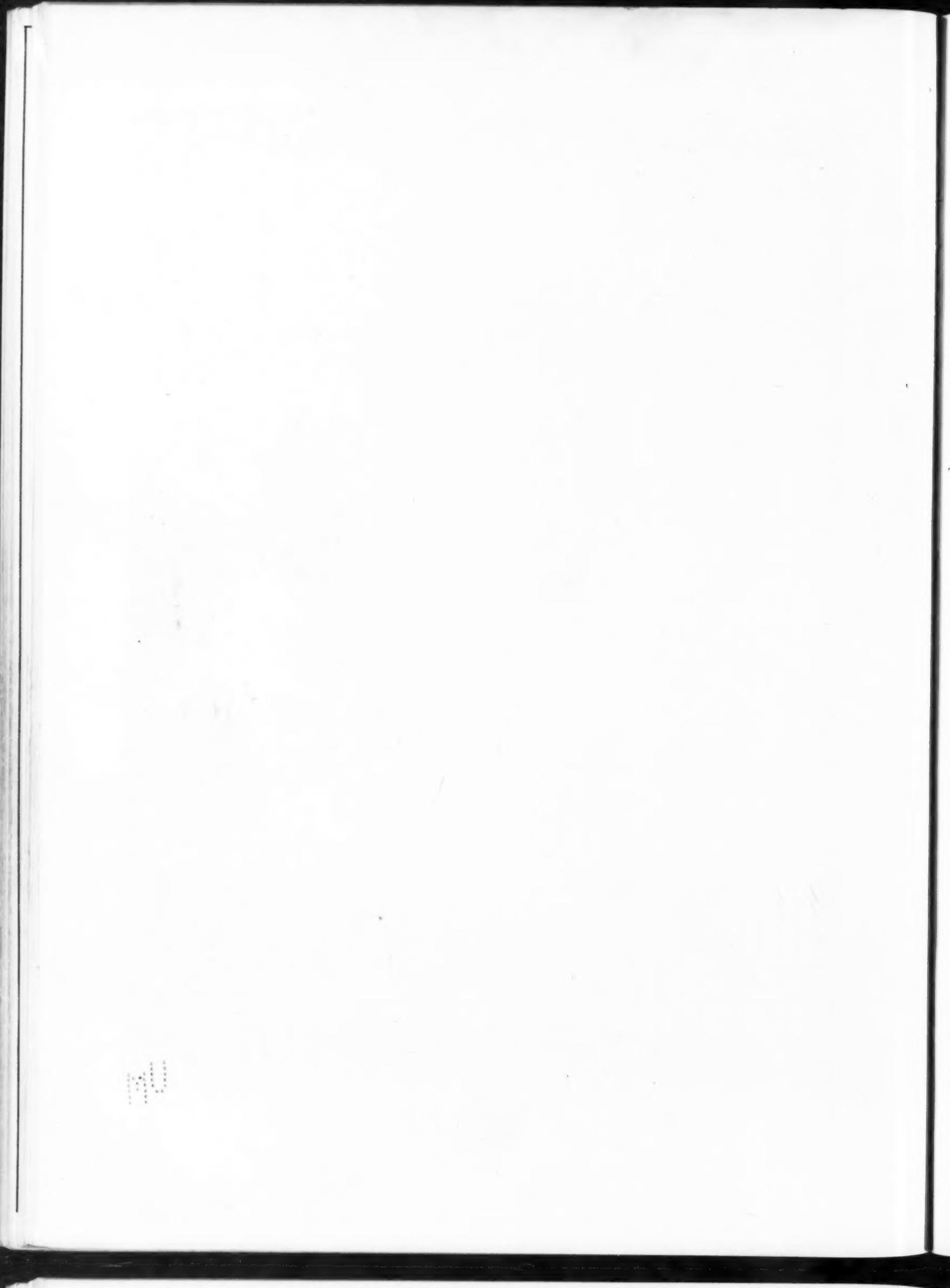
PLATE 84



COTTAGE NUMBER THREE



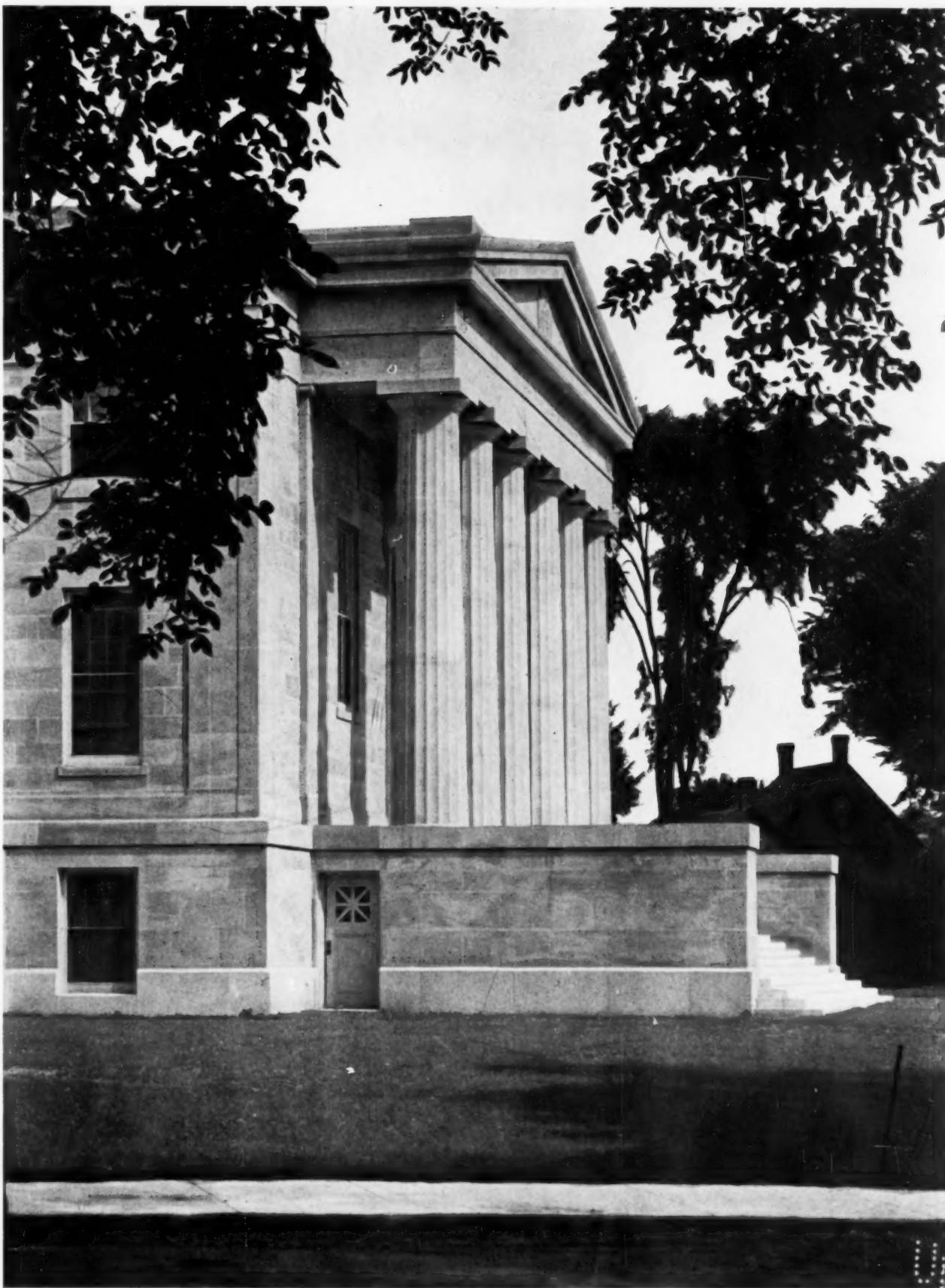
ADMINISTRATION SERVICE WING
HUTTON SETTLEMENT, SPOKANE, WASH.
WHITEHOUSE & PRICE, ARCHITECTS



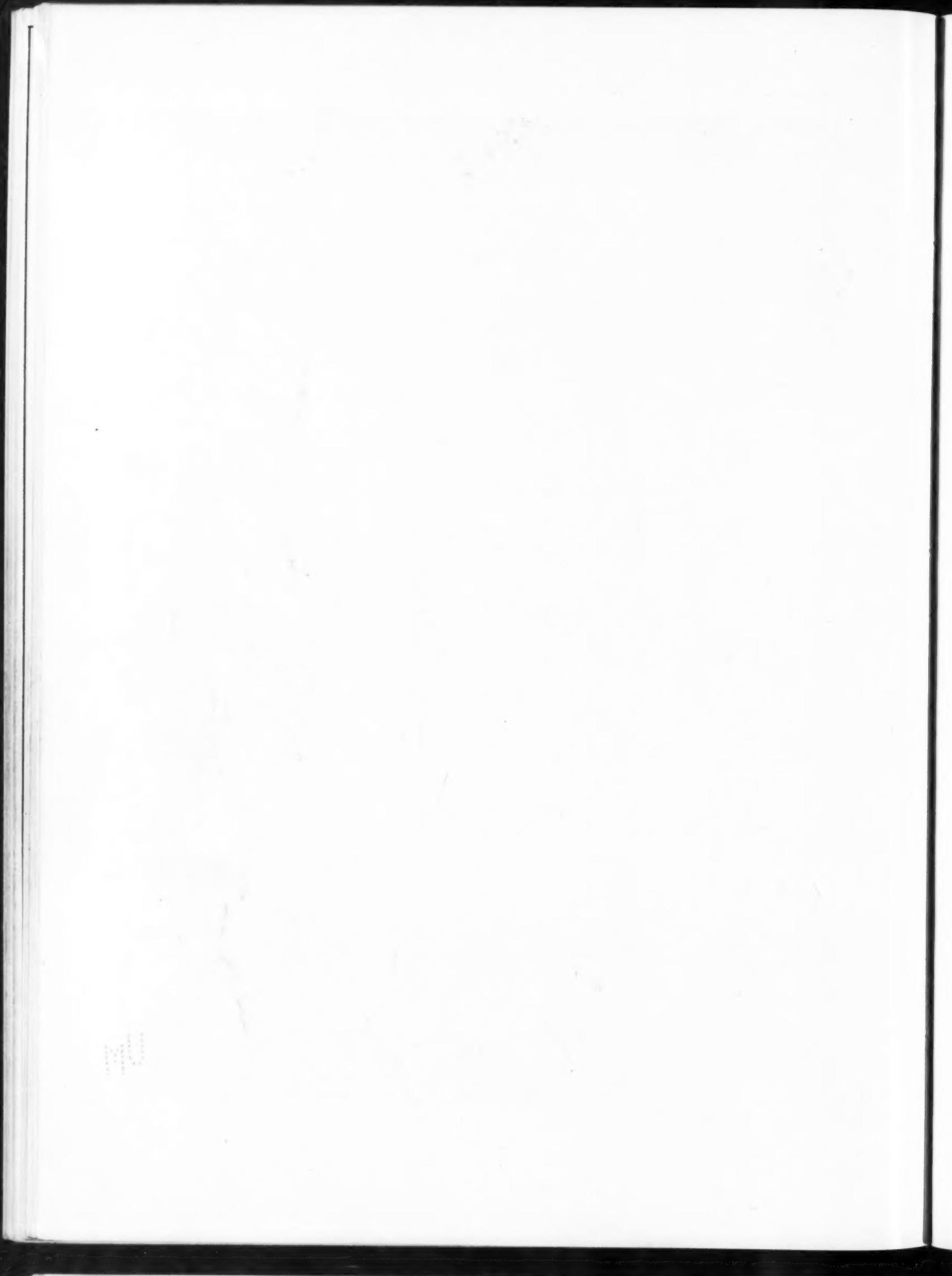
DECEMBER, 1920

THE ARCHITECTURAL FORUM

PLATE 85



PORICO ON MAIN FAÇADE
CITY HALL, PLATTSBURGH, N. Y.
JOHN RUSSELL POPE, ARCHITECT



DECEMBER, 1920

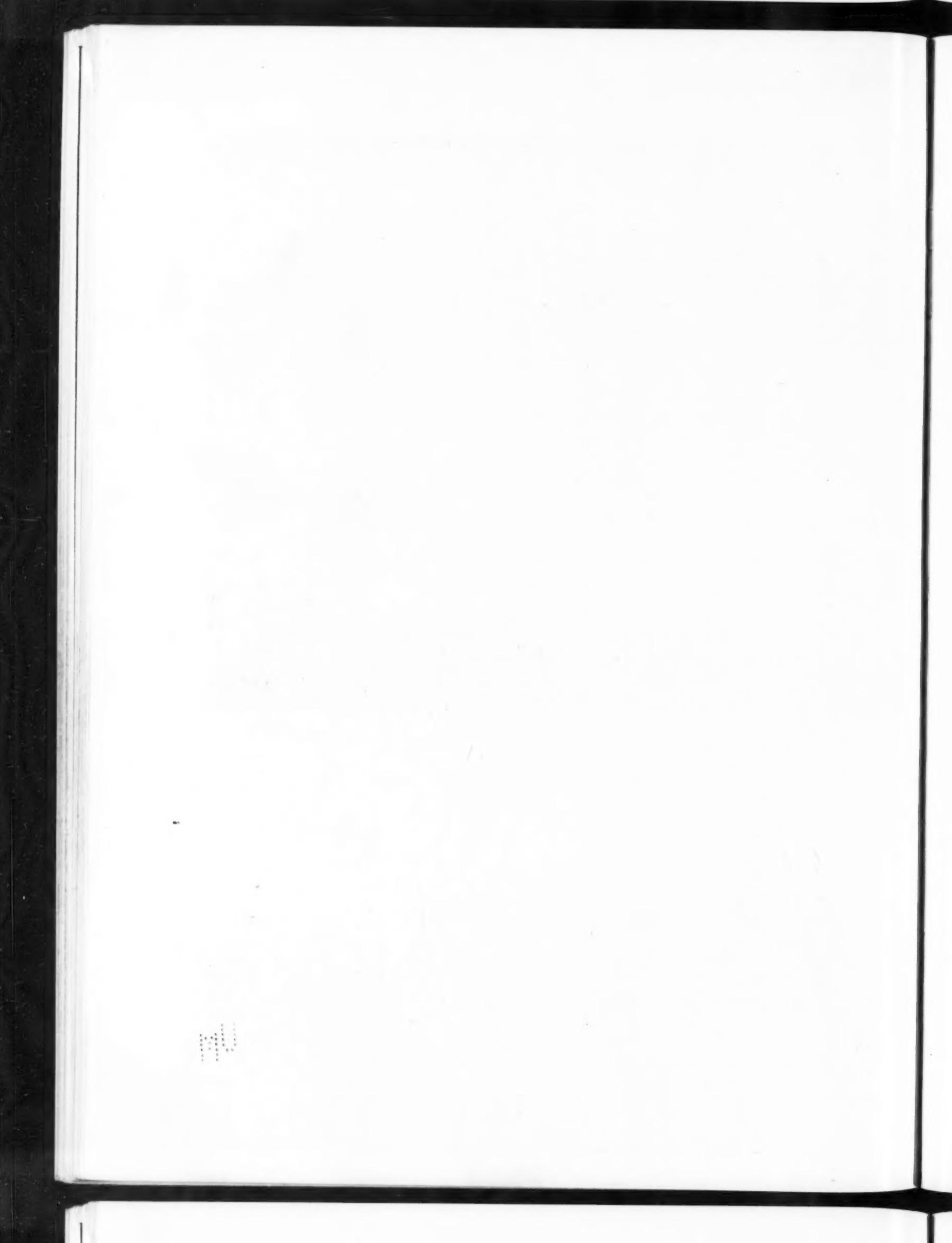
THE ARCHITECTURAL FORUM

PLATE 86



MAIN FAÇADE

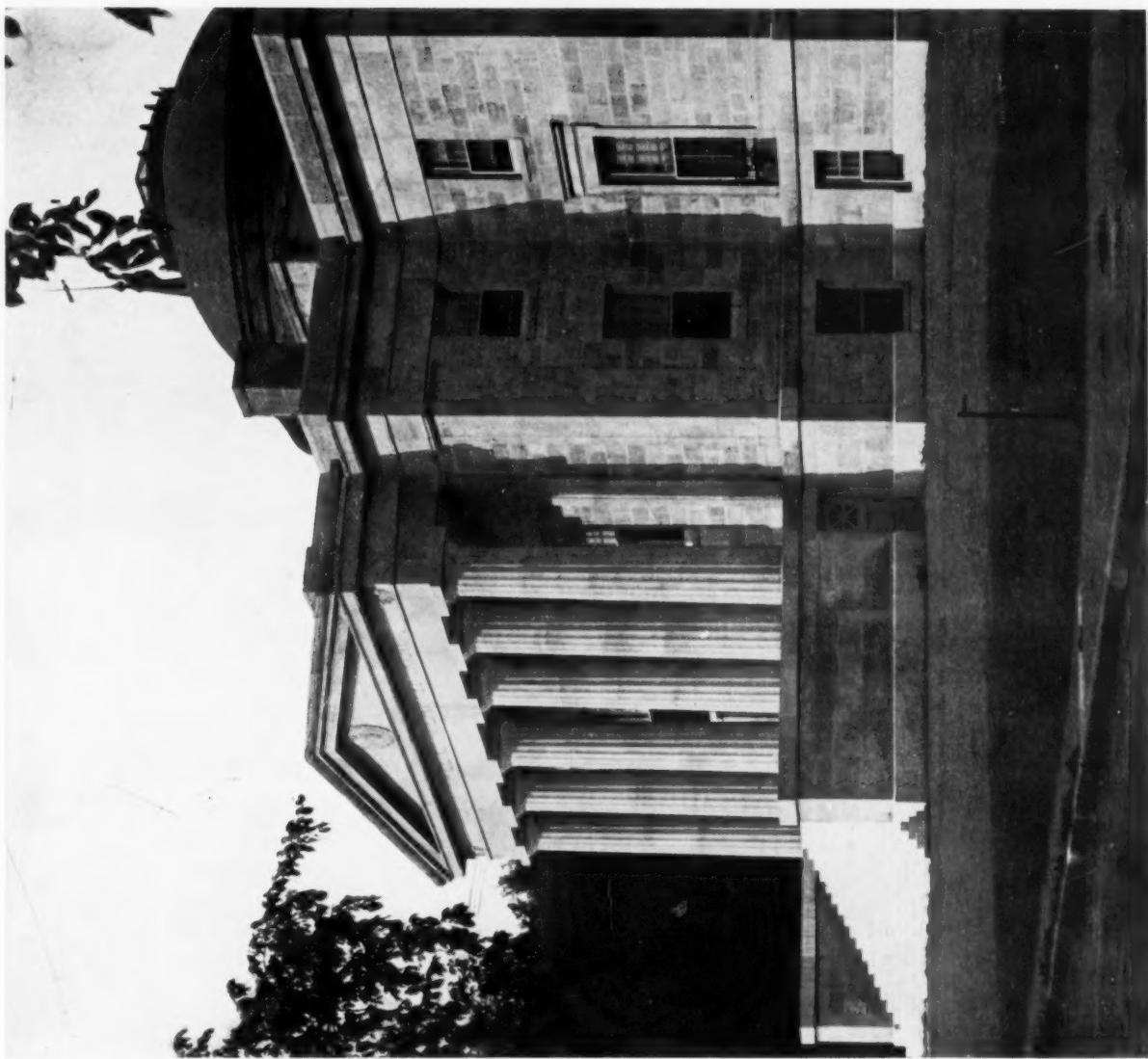
CITY HALL, PLATTSBURGH, N. Y.
JOHN RUSSELL POPE, ARCHITECT



DECEMBER, 1920

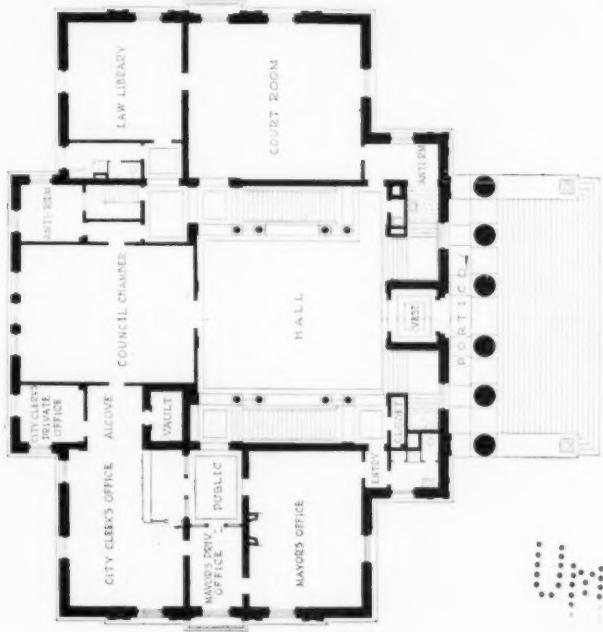
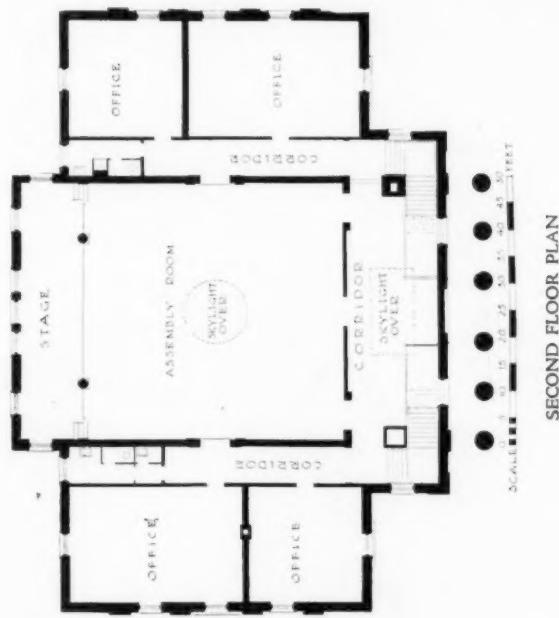
THE ARCHITECTURAL FORUM

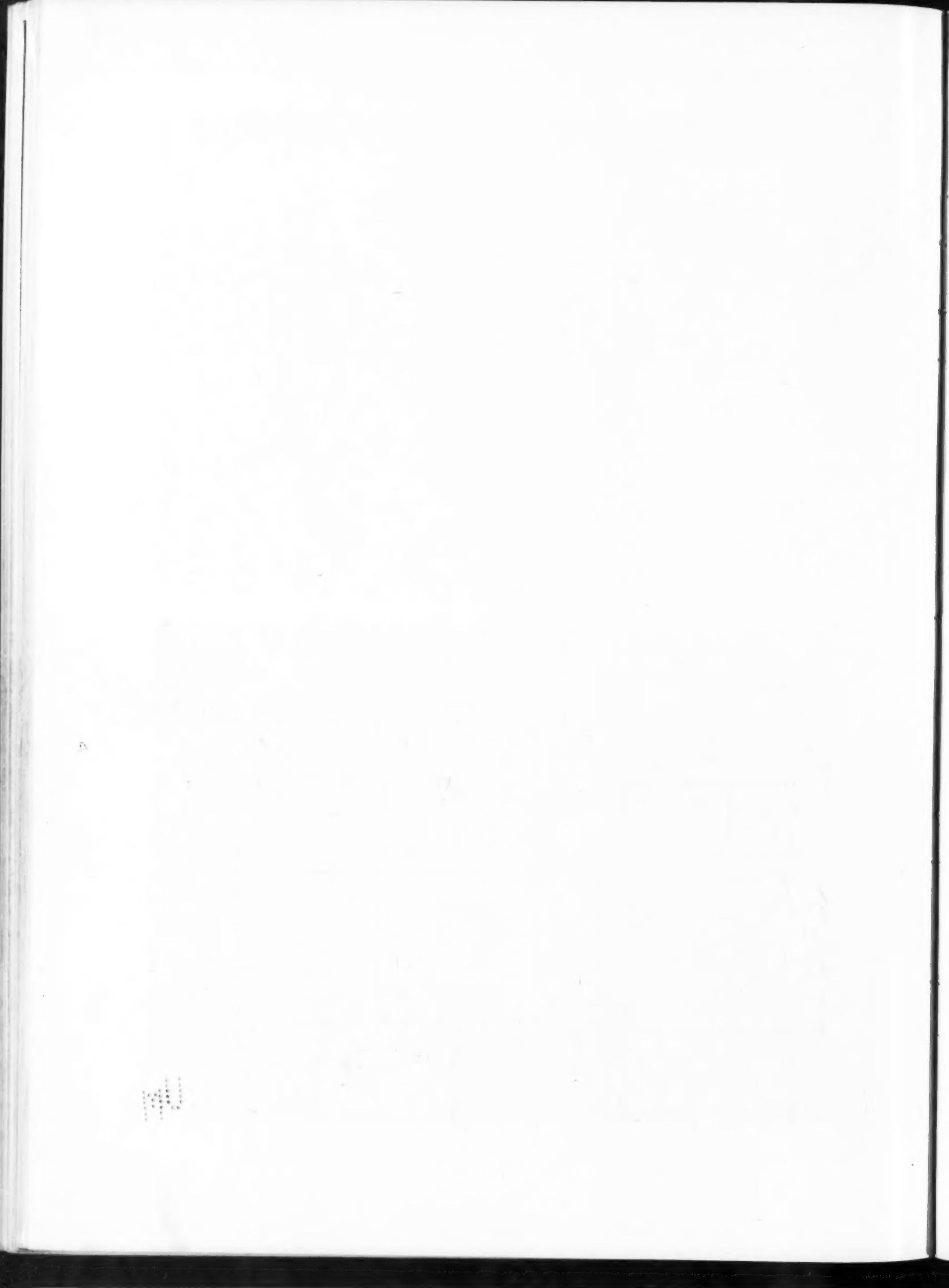
PLATE 87



VIEW FROM STREET

CITY HALL, PLATTSBURGH, N. Y.
JOHN RUSSELL POPE, ARCHITECT





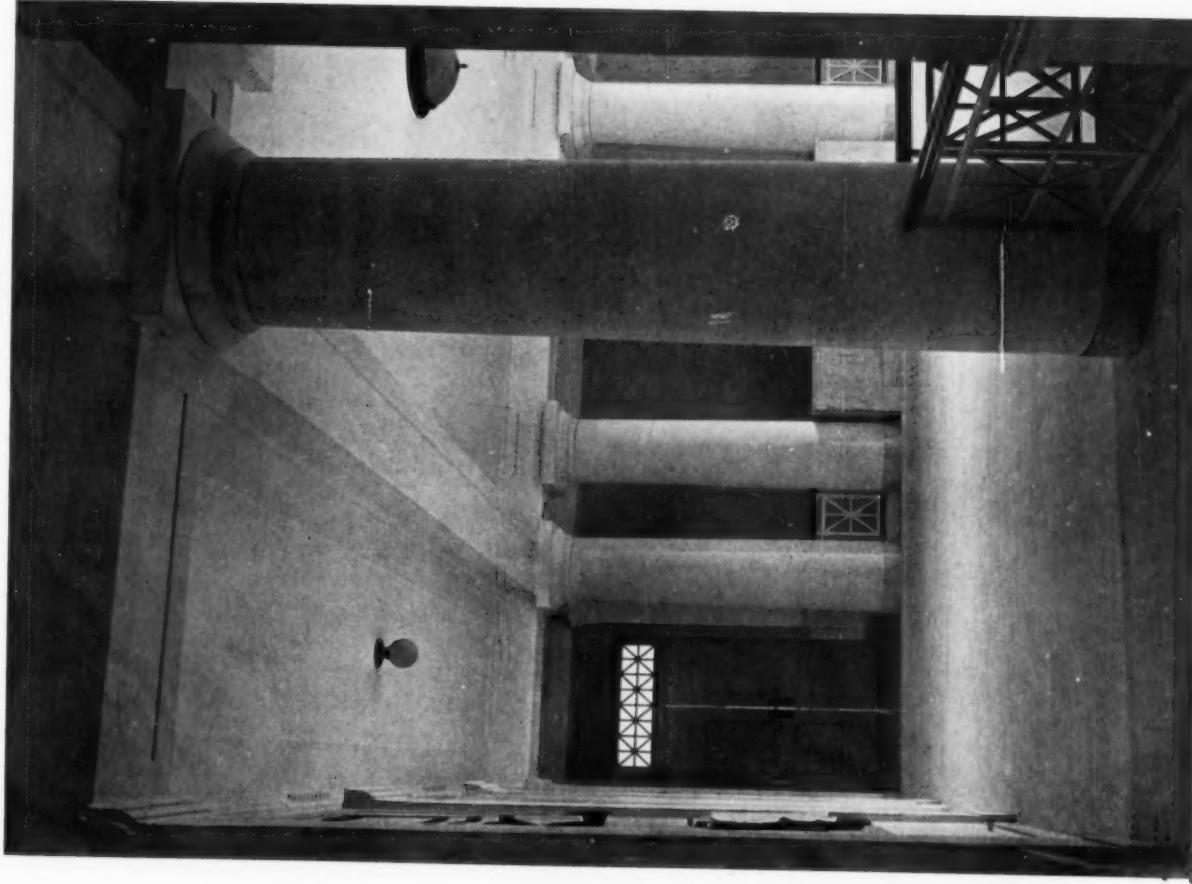
DECEMBER, 1920

THE ARCHITECTURAL FORUM

PLATE 88

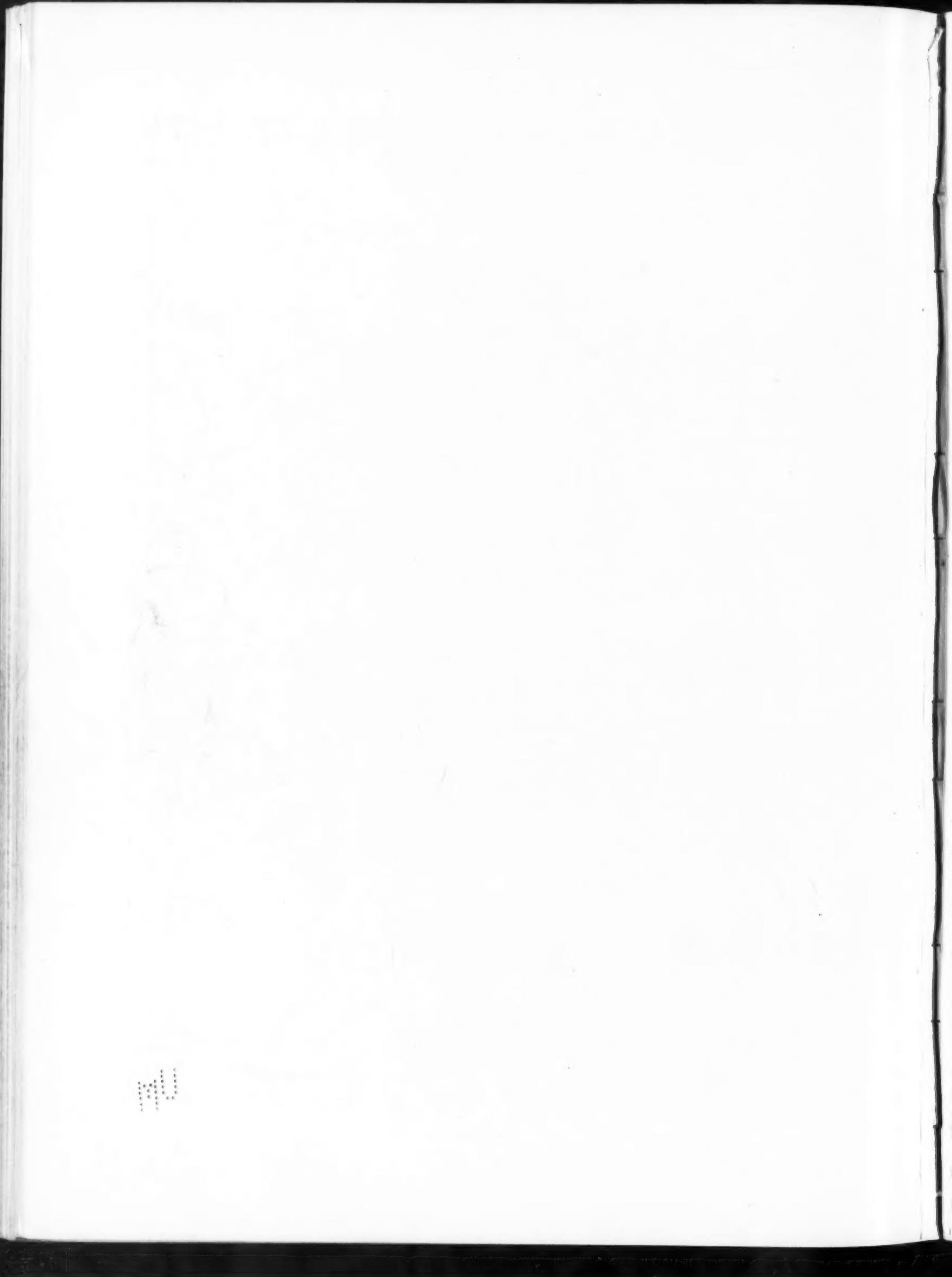


SOUTH FAÇADE



ENTRANCE HALL

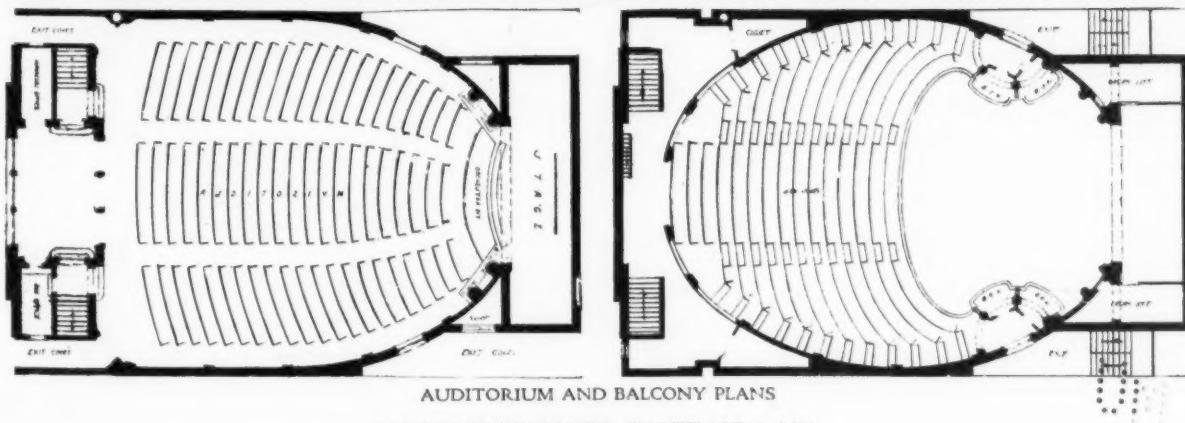
CITY HALL, PLATTSBURGH, N.Y.
JOHN RUSSELL POPE, ARCHITECT



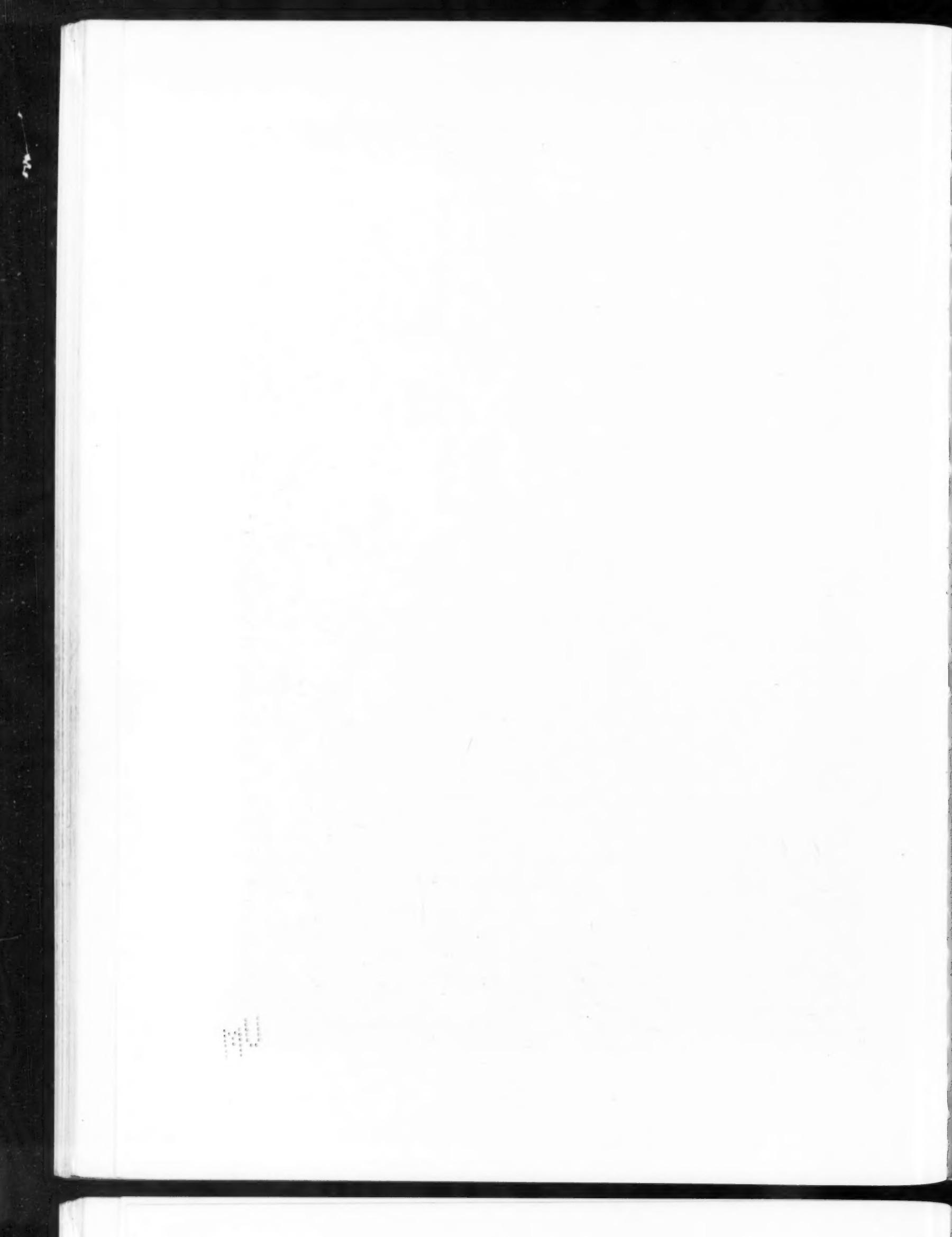
DECEMBER, 1920

THE ARCHITECTURAL FORUM

PLATE 89



AUDITORIUM AND BALCONY PLANS
PARKWAY THEATRE, BALTIMORE, MD.
OLIVER B. WRIGHT, ARCHITECT



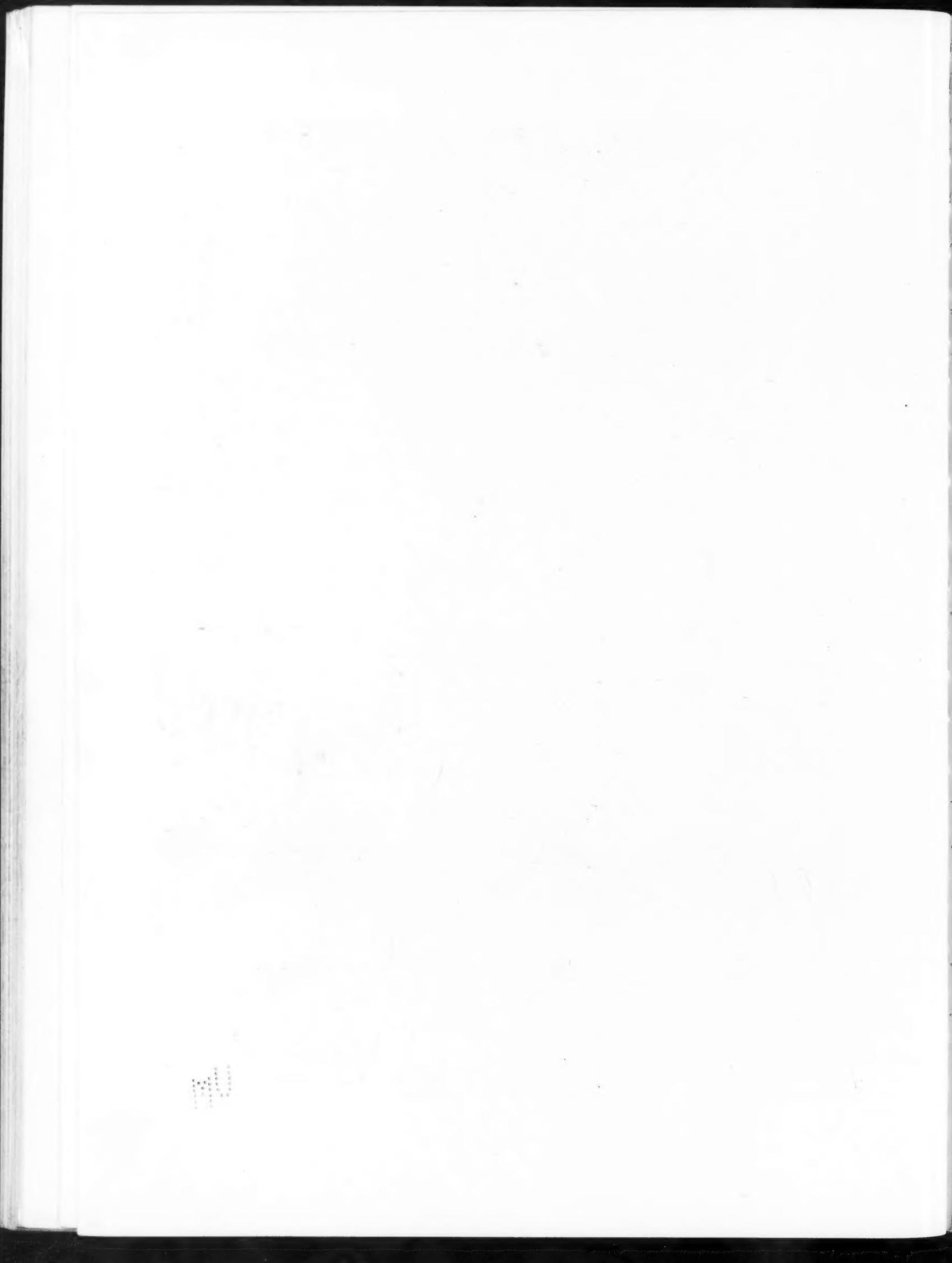
DECEMBER, 1920

THE ARCHITECTURAL FORUM

PLATE 90

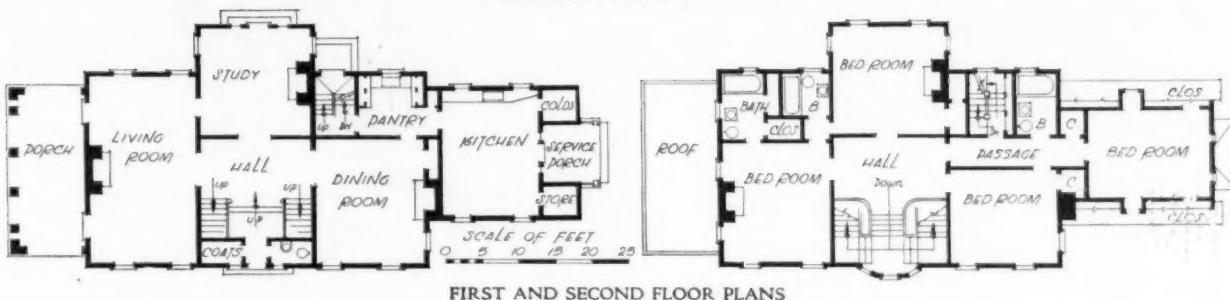


VIEW OF ENTRANCE FRONT
HOUSE OF MRS. I. F. WARDWELL, STAMFORD, CONN.
AYMAR EMBURY II, ARCHITECT





DETAIL OF ENTRANCE



HOUSE OF MRS. I. F. WARDWELL, STAMFORD, CONN.

AYMAR EMBURY II, ARCHITECT

200

DECEMBER, 1920

THE ARCHITECTURAL FORUM

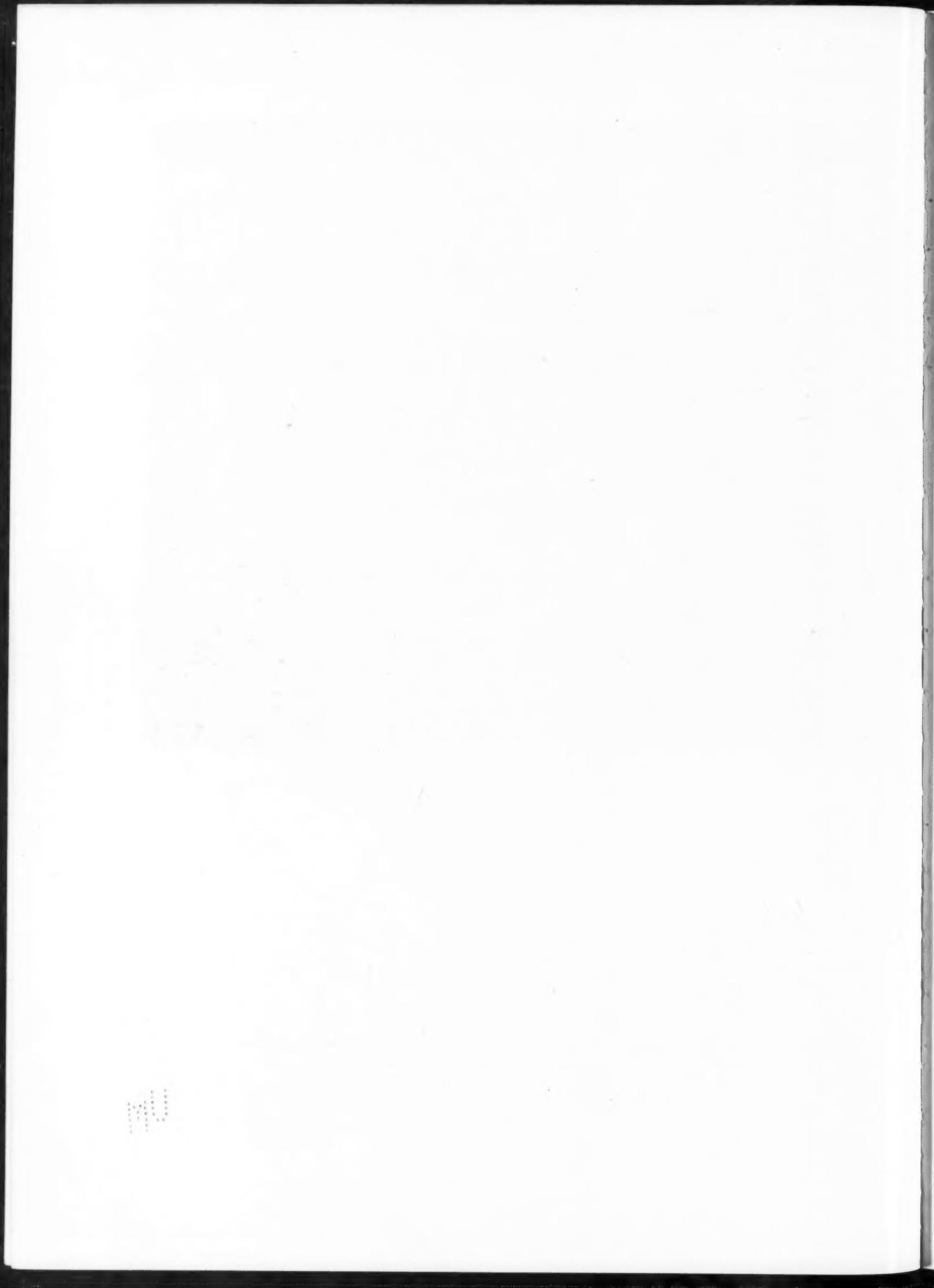
PLATE 92

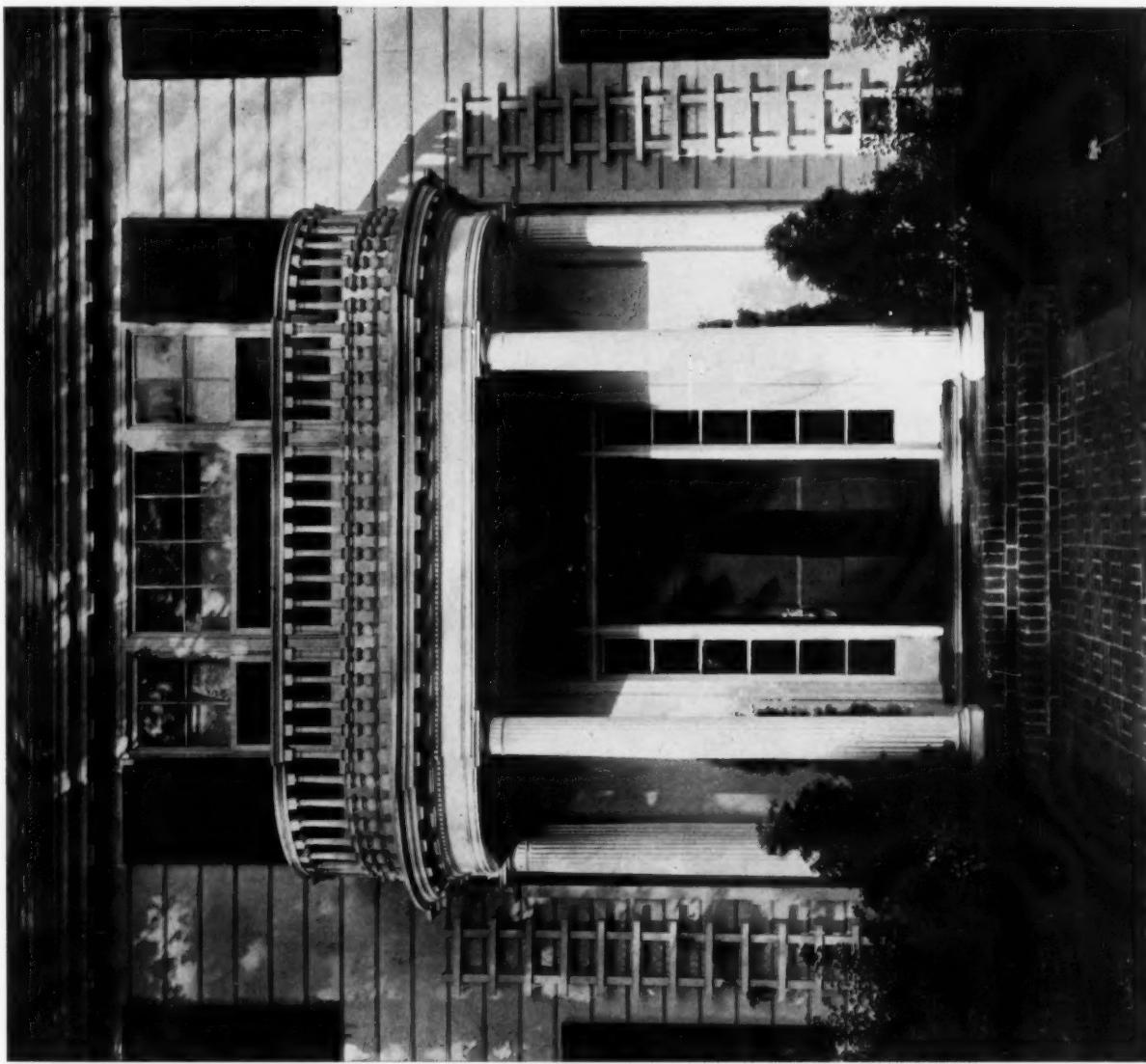


VIEW OF ENTRANCE FRONT

HOUSE OF JAMES T. WHITEHEAD, ESQ., DETROIT, MICH.

CHARLES M. BAKER, ARCHITECT

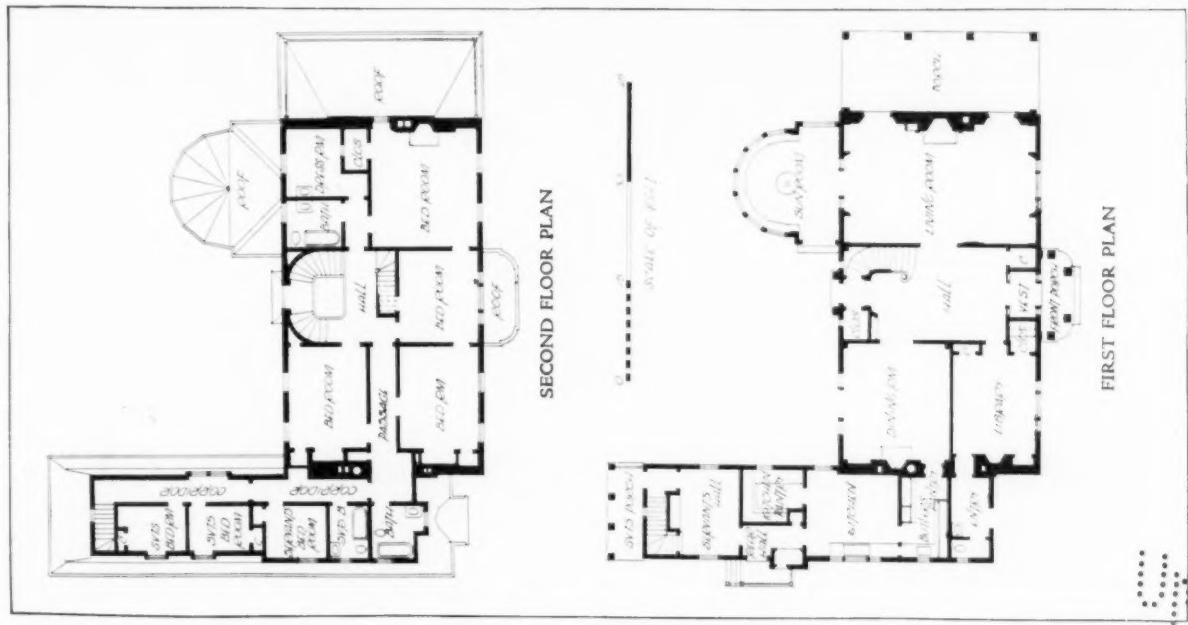


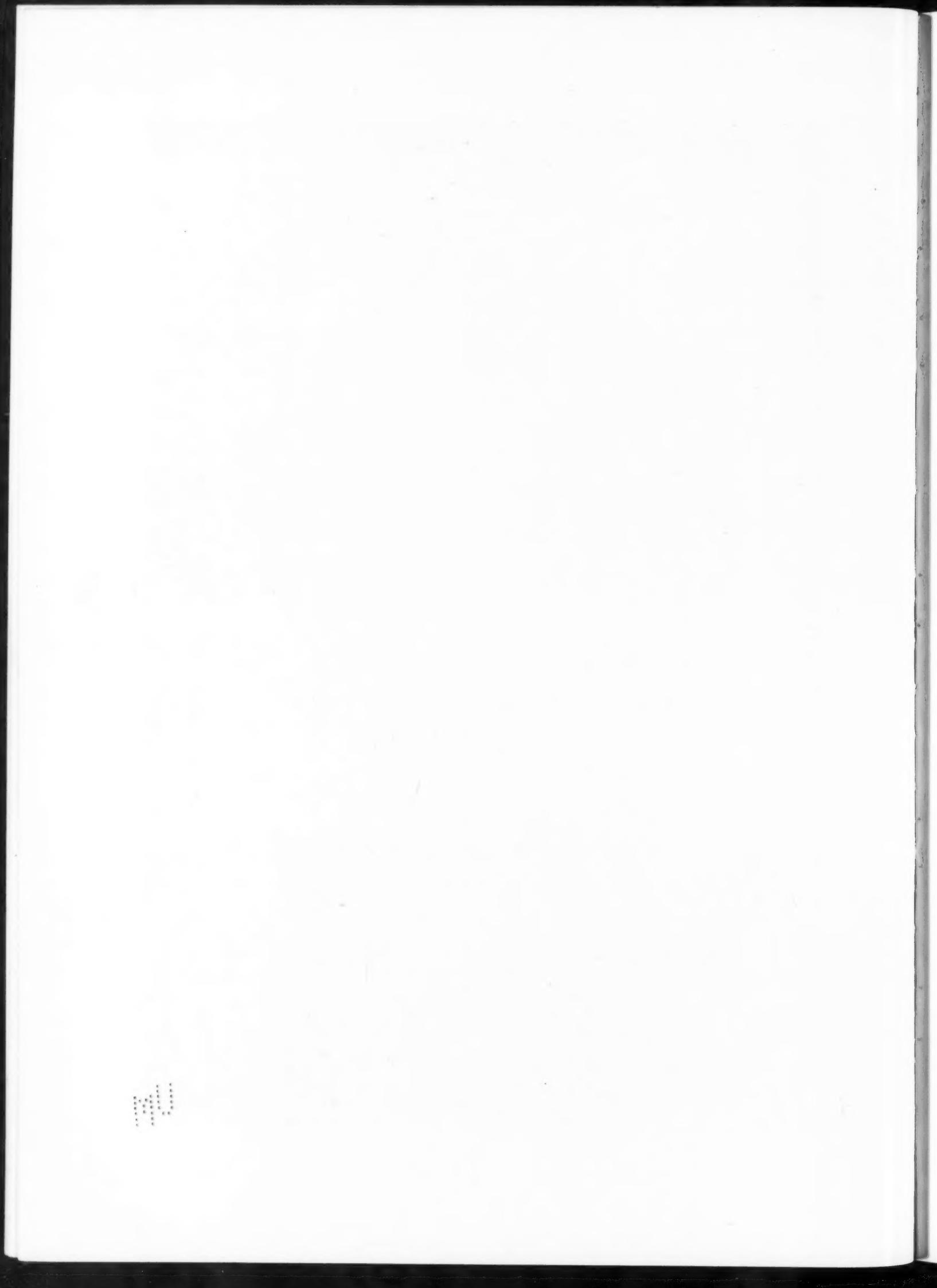


DETAIL OF ENTRANCE

HOUSE OF JAMES T. WHITEHEAD, ESQ., DETROIT, MICH.

CHARLES M. BAKER, ARCHITECT

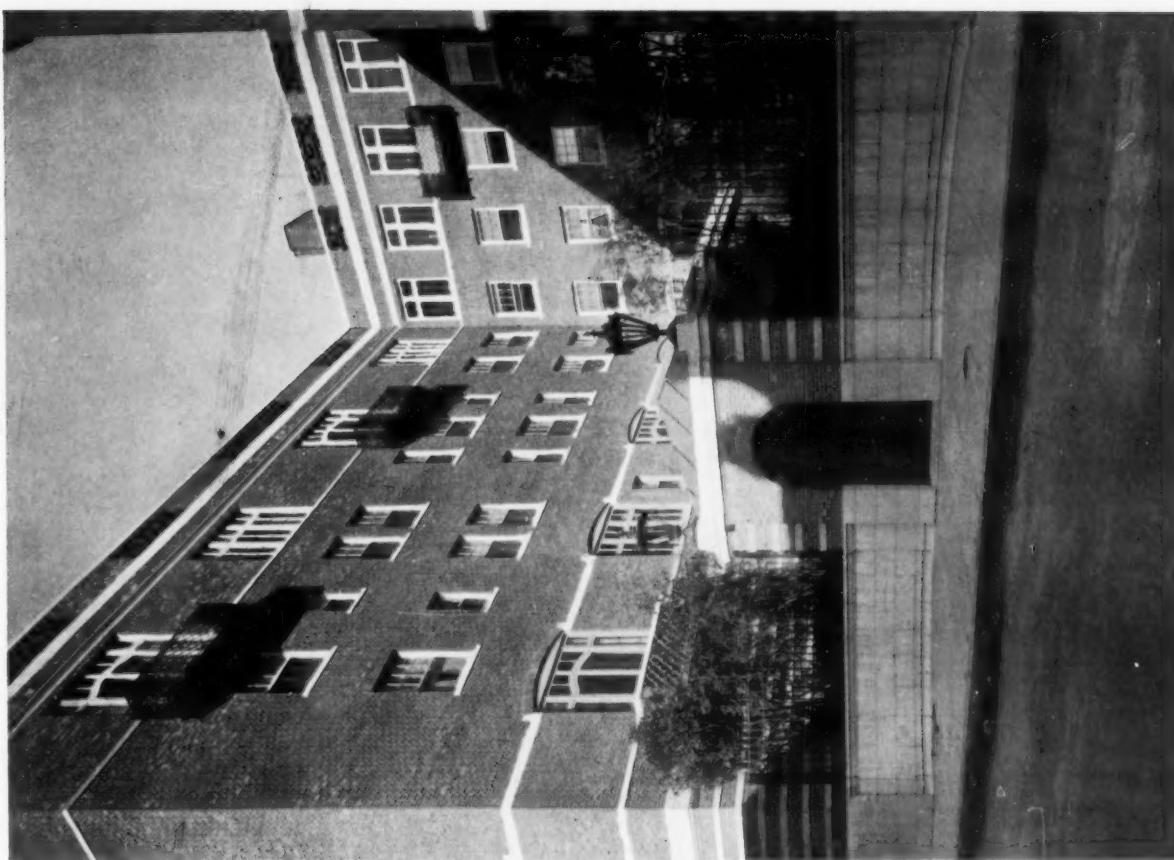




DECEMBER, 1920

THE ARCHITECTURAL FORUM

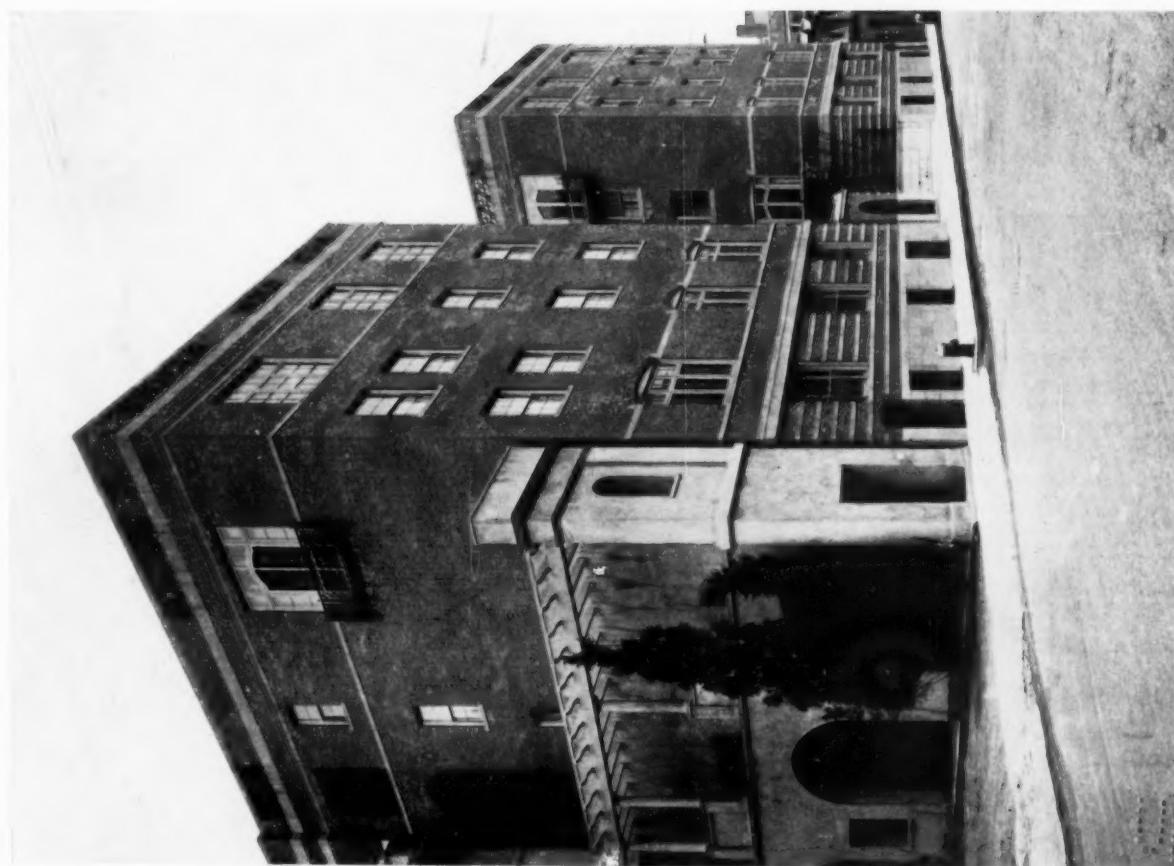
PLATE 94

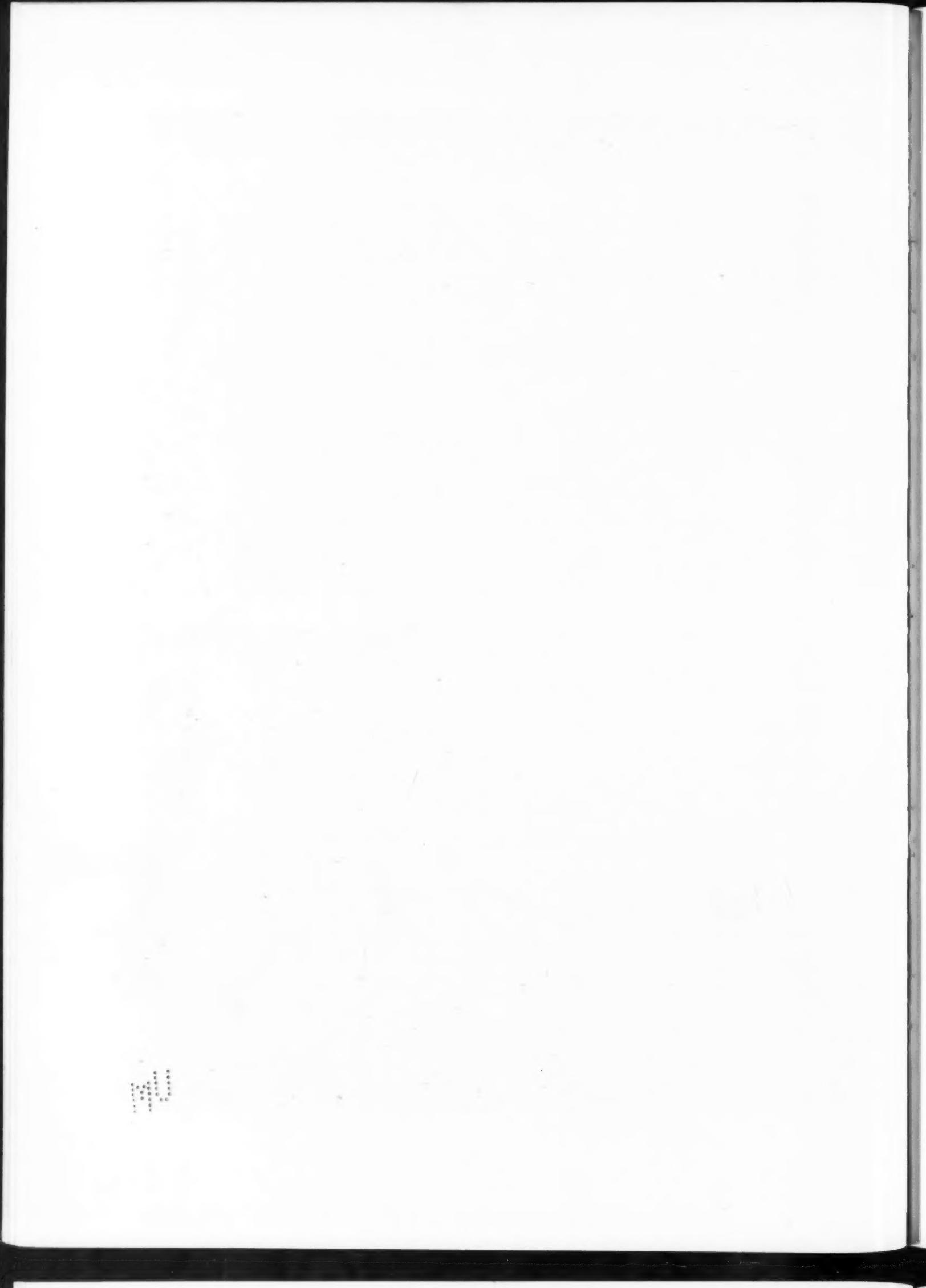


GENERAL VIEWS

APARTMENT BUILDING, CHESTNUT STREET, BOSTON, MASS.

RICHARD ARNOLD FISHER, ARCHITECT





DECEMBER, 1920

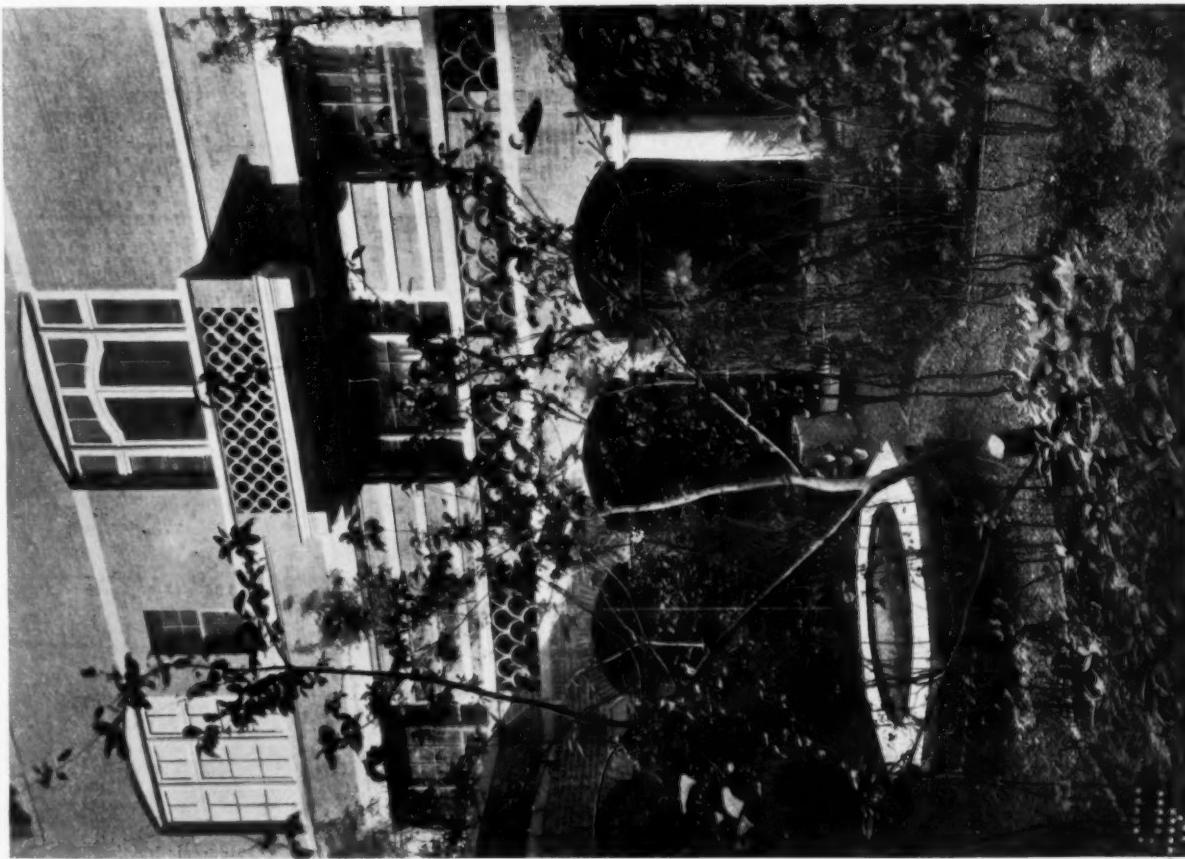
THE ARCHITECTURAL FORUM

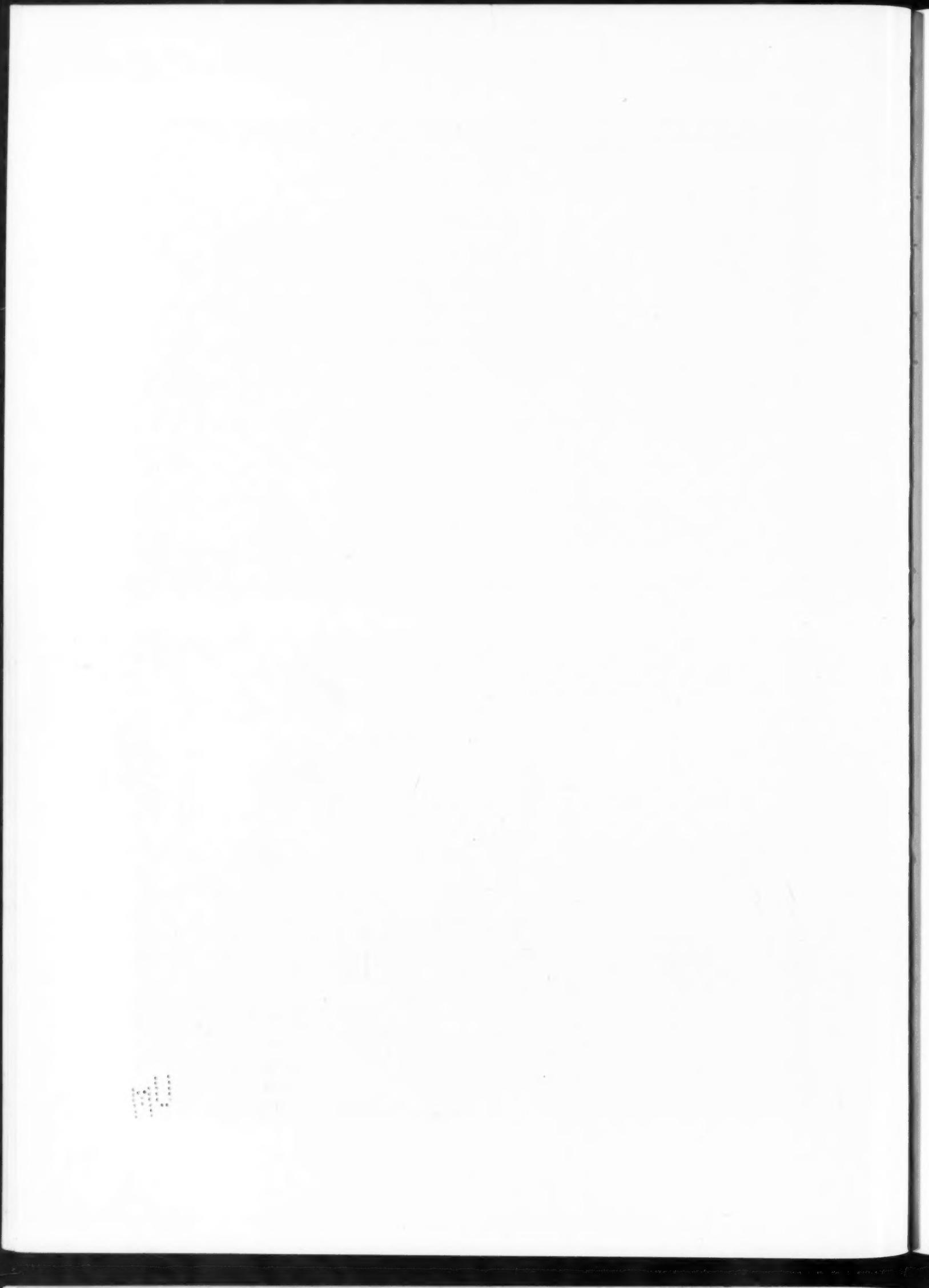
PLATE 95



DETAILS OF COURTYARD

APARTMENT BUILDING, CHESTNUT STREET, BOSTON, MASS.
RICHARD ARNOLD FISHER, ARCHITECT





DECEMBER, 1920

THE ARCHITECTURAL FORUM

PLATE 96

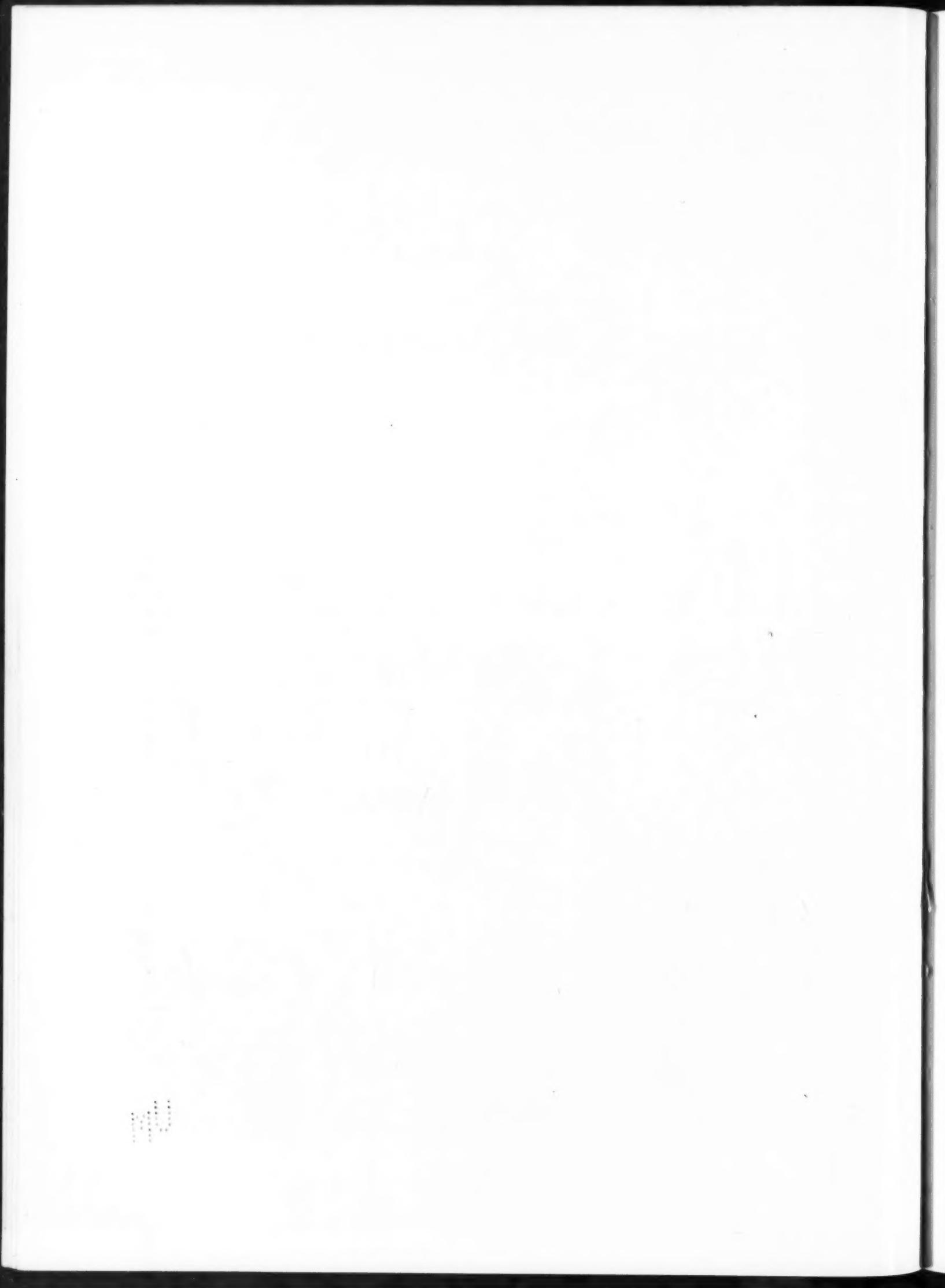


TYPICAL INTERIOR VIEWS

APARTMENT BUILDING, CHESTNUT STREET, BOSTON, MASS.

RICHARD ARNOLD FISHER, ARCHITECT







THE EDITORS FORUM



ARCHITECTS SHOULD WATCH BUSINESS CONDITIONS

THERE was perhaps never a period in the history of modern architectural practice when in spite of an insistent demand for buildings there were more difficulties in the way of getting actual work under construction. This is, of course, due to the abnormal conditions applying in the business world following the strain of war. Conditions, moreover, are constantly changing and various new factors arise from month to month that seriously affect the business outlook.

During any period of feverish activity such as followed the war interest in conservative and low dividend paying investments gives way to free speculation offering greater returns. We may take, for instance, the falling off of the bond market. While stock investments and speculation amounted to amazing figures, the demand for conservative investment and safe bonds has fallen off to such a point that bond quotations have been lower than during critical days of the war. Even the most stable forms of gilt-edged security, such as Government bonds and public utility bonds, have reached low levels of quotations as evidenced by the depreciation in Liberty bonds.

Even as bond investment is conservative, so investment in building projects is conservative. The average bond pays a well defined interest on the money invested. There is nothing showy and no great speculative profit is to be expected. Similarly in building investments which are not of a speculative nature there is a fairly well defined limit on the amount of interest which one may receive.

Throughout the country there is a reactionary wave sweeping through the business field that in general is of a somewhat depressing nature, and in some sections there is even talk of a panic. Judging broadly, it would seem that the ordinary type of business panic is out of the question, as this usually comes when production is much greater than demand. We face the opposite condition today, when the only possible sharp panic is a type which has been described by prominent statistical authorities as an "underproduction" panic. In other words, when production cannot meet demand, coupled with the high cost of production, there is created a situation where there is little profit in the limited volume of production possible.

The fact that the actual buying of commodities and luxuries is falling off shows that the public will not stand much more price raising, and this fact, coupled with Governmental control and price-fixing activities, is decreasing public interest in

investment in industrial securities, where great profits were made during the war period.

Hence we now face a condition where the public is thinking of leaner years to come and instead of using rapidly accrued money in the purchase of luxuries and in the more extravagant forms of speculation, the tendency right now is to stop all kinds of buying other than that of necessity, and to hold on to see what the future will bring.

THIS is the attitude many loaning institutions have taken, and, as a consequence, a decided falling off in building is noted. Transportation difficulties are likewise playing an important part in the slowing up of building. The demand for buildings of all types continues great nevertheless and, with the prospect of good business for several years as soon as conditions have become somewhat stable, there are to-day many opportunities to carry out building operations that will insure attractive returns if the money to finance them can be had. Necessity always proves the mother of invention, and it is so to-day in the present building difficulties. In the eastern section of the country money for construction is being found by the use of the co-operative idea. This is simply a means of getting prospective tenants of property to finance construction by advancing amounts of money that might be considered as advance rent payments.

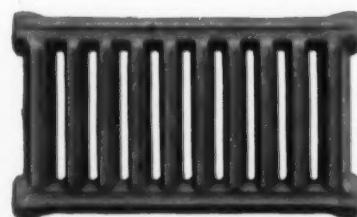
The procedure is clearly outlined in the Department of Architectural and Building Economics in this issue and a careful reading will repay any architect whose practice is largely in the class of investment building.

In general the curtailment of building may be looked upon as an advantage. It cannot be of any great duration; in the meantime the lack of transportation will permit some accumulation of building materials with possibly slight price reductions, building labor will have had an opportunity to estimate the effect of its destructive tactics, and the deflation for which the banks are working will bring about renewed interest in conservative investments. The conditions when building again becomes active will not be very different from those at the end of the war. There will be a decided advantage to those who start building operations first. So much building is needed that once the movement starts there will be great activity, and materials will again become scarce and high priced under pressure of demand. Architects should advise their clients to prepare their plans now so that advantage may be taken of the first favorable conditions.

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THE EDITORS FORUM

D. KNICKERBACKER BOYD SELECTED FOR IMPORTANT BUILDING SERVICE

LABOR conditions have been giving every one connected with the building industry very great concern since the resumption of building following the war. Rapidly increasing wages augmented by evidences of decreased efficiency have been looked upon as ruinous, and in spite of varied attempts at finding an amicable solution of the difficulty, conditions have grown no better. We have lamented the absence of interest of the workman in his trade, his chief concern appearing to be to work as small a number of hours as possible and to exact in return the largest wage without any thought of the quality of service he rendered. It has many times been said that interest in craftsmanship—love of work for its own sake—would have to be revived in the workman before we could again have satisfactory working conditions or produce any work of quality. This has been said, but how seriously has any one tried to go about securing it?

It may come as a surprise to architects to know that a group of labor unions in Philadelphia has come forward and actually done something toward that end. But back of that there is a suggestion made by an architect that awakened in the laboring men a different spirit than we have been able to see by looking only at the surface. D. Knickerbacker Boyd is the architect and to him is due the credit for having inaugurated a movement among labor unions that is unprecedented and which promises to develop a system of intelligent contact between workers and employers in the building industry that should go far toward eliminating the friction so prevalent.

Last autumn Mr. Boyd gave an address before the Council of the Allied Building Trades in which he urged that labor should devote a larger portion of its meetings to matters of education and information, concerning itself with improvements in the various crafts and trades, and that discussions of strikes, wages and hours should give way to discussions of opportunity for co-operation with others and service to the public at large.

The direct result of this was the establishment of classes in the Bricklayers' Union to study their own craft and to learn the principles of plan reading. At every meeting of the Union last winter, under the auspices of Mr. Boyd, addresses were given by men prominent in building circles with the result that the workmen took greater interest in their occupation, became more efficient and more appreciative of the aims and ideals of the designers and occupants of buildings.

With this proof of the value of co-operation and human contact, arguments were advanced that similar results could be had in other branches of building and that harmonious relations could be

maintained between the unions and employers if the respective organizations could be brought together instead of working separately as they always have done. Labor considered that architects represented the consumer in a way approached by no other profession or business, and it was determined that building labor should place its confidence in an architect to aid in bringing about the co-operation desired.

Mr. Boyd was asked to assume this duty which he has accepted. He will head a committee of nine, four members of which have been appointed by the Council. The remaining four Mr. Boyd has full authority to select. In the time preceding the completion of the committee he is authorized to represent the nineteen building trades unions of Philadelphia before any builders' or other similar organizations.

THE COTSWOLD TRADITION

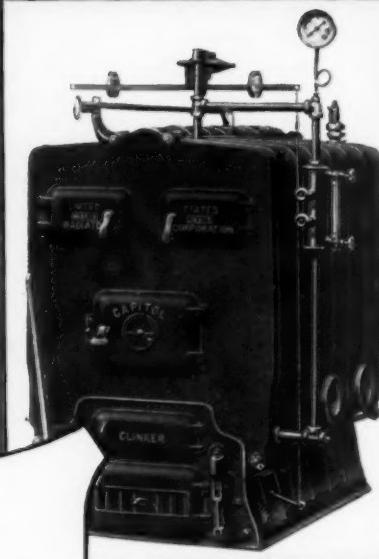
IN late years American architecture, particularly as it applies to country house work, has been striving toward a simpler expression; we have been paying less attention to dogmatic styles and have been aiming at a pleasing expression of domesticity through an intelligent use of local materials.

This is the quality which has always called forth our praise of English domestic work. English architects have not been noted for brilliant ingenuity; they have, however, long enjoyed a reputation for exercising good taste in the use of materials and for creating a home-like atmosphere in their country houses. It is but logical, therefore, to look to English architecture for inspiration in the use of materials. In the Cotswold district there developed a type of house which was the result of local craftsmanship working with local materials.

This type of design and building finds ready application in parts of the United States where similar conditions exist as in the English locality. In Pennsylvania, for instance, we have a native stone that closely resembles the English stone. What could be more sane or appropriate than to be guided by the stone houses of the Cotswolds where several generations have developed a type of building that displays to the fullest degree the characteristics of this stone? A group of Philadelphia architects have done this and in adapting the Cotswold principles to American requirements they have produced a local type of great interest.

In the preceding issue of the *FORUM* we illustrated a number of such houses from the designs of Duhring, Okie & Ziegler. For purposes of comparison in this issue we illustrate a modern English house designed in the Cotswold spirit that shows the essentially domestic appeal of the type and the sincere way in which the English architect respects local tradition.

CAPITOL BOILERS



In Operation

Please see the owner and
confirm the judgment
of the man who
specifies them

"It's the TEST that tells"

UNITED STATES RADIATOR CORPORATION

GENERAL OFFICES: DETROIT, MICHIGAN
BRANCH OFFICES IN PRINCIPAL CITIES



THE EDITORS FORUM



THE difficulties with which we are contending in reconstructing the business of the country are greatly stimulating thought along economic lines, and not a few see in the widening gap between the forces of labor and capital evidence that our industrial system is founded on wrong premises. It is undeniable that all thoughtful people wish to see a community of interest developed that will guarantee contentment of all forces on which we depend for the prosperity of the country. In the following letter Mr. Ackerman asks some pertinent questions suggested by a recent editorial. His query as to what constitutes stable conditions for the majority should be of interest to architects because of their peculiar professional position.

To the Editor:

I wonder whether or not your editorial in the July FORUM expresses the attitude or the viewpoint of the Architectural Profession toward building and labor. In any event it is a subject worth discussing since it seems to me that in the viewpoint expressed we have evidence that the nature of the problem has not been discovered.

Like most arguments of the kind, this editorial points out that "while diminishing activity is not looked upon as a happy prospect, there is promise that out of the present situation will come several adjustments that will mean better and more *stable conditions*." After reciting notorious conditions relating to transportation, coal production, preferential freight rulings, the effect of deflation, the short time operation or the complete closing down of plants, the editorial states with respect to the last: "This is releasing many workers . . . the extreme shortage of *help* in the building industry is gradually being changed to a *reasonable surplus*. This will have a *steadyng effect* on building labor because . . . their success in gouging high wages has not been due essentially to their organization but to the *natural law of supply and demand* . . . and, if the present slack in building is responsible for nothing else than *bringing labor down to earth*, any resultant sacrifice will have been wisely made."

Thus an attitude toward the problem before us is quite clearly defined; and what is commonly understood by *stable conditions*, by *help*, by *reasonable surplus* (labor), by the *natural law of supply and demand* is quite as clearly revealed, both by direct statement and by implication. We discover what is meant by a *steadyng effect*; we are afforded an insight into how it is that the present industrial system goes at its task of providing necessary goods and services. A hope is voiced in the plan suggested and in the prophecy made.

Within the realms of Business Enterprise, a *stable condition*, a good condition, a right condition, is evidently one in which there is a *reasonable number* of men who have no jobs. This expresses one of the curious elements of the business viewpoint. We are given an insight into its limitations. It fails utterly to realize that, to those who make up the *reasonable surplus*, *stable conditions*, good conditions, right conditions *must of a necessity appear as quite the opposite in character*. There is not much reason in this scheme as viewed by the *reasonable surplus*, — those who have no jobs.

And it is curious economics. For how in the name of Common Sense is this *reasonable surplus* of men and their families, — whose existence is demanded by the scheme, — how is this surplus to live? No one has been able to make this plain.

No doubt when conditions with respect to labor supply pass from a shortage to a surplus there will appear to be a

steadiness as viewed from the outside. But the disappearance of jobs is not likely to be so viewed by one whose job suddenly disappears while the price of food, clothing and rent remains stationary or rises. But by what method of rationalization it can be worked out that things would remain *steady* with more men than jobs is not disclosed.

I suspect that it is the tenacious clinging to this concept of *stable* or *normal*, on the part of those who are certain to benefit by conditions being *stable* in this particular sense, which really accounts for the general conditions of *instability* which, as everyone knows, have obtained for a long time.

Some little light is thrown upon the nature of what is referred to as the *natural law of supply and demand*. Apparently we have gotten into a settled habit of throwing whatever operates toward a beneficent end *as regards our own pecuniary circumstances* into the category of *natural laws*. Whenever events move in the opposite direction, that is to say, when circumstances shift in such a way as to involve us in a pecuniary loss, we account for the shift by saying that it is due to "disturbing factors." There is little doubt that in the minds of a rapidly increasing number of people, faith in this law as the benevolent regulator of all social and industrial affairs is rapidly falling away. It looks as if we were rapidly approaching a period of its complete disallowance. The theory of *natural laws* — the *law of supply and demand* — does not rest, it would seem, on very secure ground.

What stands out as most clearly revealing a definite viewpoint on the part of those not rated as Labor is the reference to bringing Labor down to earth. This is said openly in the face of known facts as to the rather astonishing profits which have been made in practically all of those enterprises of financial business which have to do with supplying both necessary and unnecessary goods and services; — and also in the face of the fact that the upward curve of wages distributed with respect to the production of necessary goods has remained below that disclosing the advance in the selling price of the same. Be that as it may. Within democratic society, Labor is assumed to be free. Hence such a statement as *bringing labor down to earth* is hardly to be construed as aimed at sustaining Labor in a state of freedom. For if Labor is not free, — if it is merely relatively free, — it follows as a consequence that Labor is slave or relatively slave, which is precisely what Labor contends.

But let us return to *stable conditions* and *steadyng effects* by way of adding emphasis upon one point. It is because of the demand (blameless of course, under a system of investment for a profit in terms of price) upon the part of the directors of our industrial system for a speedy return to the pre-war conditions of a *surplus* of Labor, which occasions the *lack of stability* and the lack of *steadiness* on the part of all but a small minority. For a surplus of Labor, even within a small section of the wage earning community, throws the entire wage earning community into a dangerous condition of economic insecurity. The dawn of consciousness on the part of the wage earners the world over concerning the origin of this sense of economic insecurity, — the realization that under the existing system of financial business a surplus of Labor *must somehow be maintained*, accounts for the restlessness and the tactics adopted by those primarily affected.

All that has been stated should fall within the category of the perfectly obvious. But it does not so fall; fallacious economic preconceptions shut off our vision. We go on insisting that conditions are stable when they are actually quite the reverse to the majority of people. It would seem that the first step toward securing a stable condition would be to set up some more adequate definition of the term as viewed by the majority. Since this is not likely to happen, it follows that the prospects of industrial stability are as yet somewhat remote.

Yours very truly,

FREDERICK L. ACKERMAN

August 27, 1920

Winter Approaching!

This, however, brings no anxiety for the property owner whose architect has provided for the installation of



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THE EDITORS FORUM



THE RAPID DEVELOPMENT OF INTEREST IN CO-OPERATIVE BUILDING

IN the course of presenting several articles from month to month in the Department of Architectural and Building Economics it has been said several times that while active interest in co-operative building has been largely confined to New York City, ultimately there would be shown national interest in this subject and that undoubtedly a large volume of building construction would proceed through this method of financing if sufficient information on the subject could be disseminated.

Several letters which have been received recently relative to this subject tend to show the diversified and widespread interest in the question of co-operative apartment house financing and it is evident that as these plans are worked out many buildings will be constructed. Extracts from letters received from different sections of the country are given. We shall be glad to answer inquiries of other readers who may be interested in any of the questions brought out in these letters.

From a Chicago architectural firm:

"We are very much interested in the ideas contained in the article 'Co-operative Ownership to Meet the Present Shortage of Buildings' in the copy of THE ARCHITECTURAL FORUM received yesterday. If it is not asking too much we would appreciate the names and locations of a few of the buildings that have been built on this plan in New York."

From a letter from an architect:

"I am very much interested in the article in the July FORUM on co-operative ownership, and would like, if possible, more detailed information on recent buildings which are of the less expensive type of apartment in which instalments were paid for stock.

"I should also like to know in such cases how the building operation was financed, when the mortgage and minimum cash payments do not equal the cost of building as shown in the chart. How was the balance to complete operations secured? Did the contractor take the stock, or was the money secured through mortgaging this stock?

"It is impossible here to build for any such cost as shown per room; it would be more nearly double. The plan is fine and undoubtedly some such scheme will be necessary in order to promote building in the future."

From Philadelphia architects:

"We have read with interest recent articles in the FORUM relative to co-operative building. We have had in mind something of the kind for some time and would like to find out more about how it actually works out. Could you put us in touch with

anyone who has put one of these propositions through? Any suggestions you might offer to forward such a project will be appreciated."

From a Canadian realty investment corporation:

"We are subscribers to THE ARCHITECTURAL FORUM and have just read with great interest the Associate Editor's article on co-operative ownership for apartment house building.

"We are contemplating erecting a Class A apartment house building on the co-operative plan and would greatly appreciate any information as to where further statistics could be obtained of buildings which have been successfully operated and financed in this manner. Mr. Taylor refers to a prospectus of a proposed project of this sort. Would it be possible to obtain a copy?"

From a Trenton, N. J., architect:

"Referring to the article in the March edition of THE ARCHITECTURAL FORUM, 'The Co-operative Method of Financing Buildings,' I note that you say you are collecting additional data for the benefit of owners who might be interested in financing apartment house propositions on the co-operative plan.

"I am interested in an apartment house proposition in Trenton that we are trying to finance under this plan. I would appreciate it very much if you would let me have any details that I might be able to make use of in trying to put through our proposition. I would also appreciate it very much if you would forward me any further information on this subject."

From a prospective owner in Seattle:

"Will you please put me in touch with several of the companies who have organized and promoted co-operative apartment houses? I would like to get several prospectuses and learn a little more of this plan.

"Your articles appearing in June and July issues are very illuminating as well as instructive. If you have any more information or descriptive matter on the subject or if you can give me the names and addresses of any companies who have built and operated apartments on the different plans, I would be deeply grateful."

From another prospective owner in Iowa:

"I would appreciate very much, if it is possible for you to do so, that you furnish me the name and address of the attorney or attorneys who have been employed in the preparation of articles of incorporation for co-operative apartment house ventures, especially of the type costing \$200,000.

"Our building will be a twelve-family building, six stories in height and I am enclosing a print of the first floor plan and believe you will agree with me that it has exceptional merit."

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THE EDITORS FORUM



ARCHITECTS AND ENGINEERS AGAIN

RECENT months have seen a number of statements from the engineering profession claiming that architects serve only a secondary need in the planning of structures which are of a utilitarian nature. They were occasioned, primarily, by the appointment of architects within the year to supervise the design of an important bridge at Pittsburgh. The *Engineering News Record*, which is most alert in promoting the welfare of engineers, has now found a bridge designed by an architect on which some ornament is rather senselessly applied and the editors present comments of engineers as conclusive proof that architects are entirely out of their proper field when designing bridges.

It is interesting to note that although architects took little or no interest in our contemporary's absurd statements, at least a few engineers have recognized the injustice to the profession and have presented a true estimate of the architect's service which it has given us much pleasure to read.

The comments of Mr. N. H. Holmes, assistant engineer with Charles T. Main, Boston, are so evidently sincere and expressive of the feeling that should exist between architects and engineers that we quote them in part.

"To select some examples of exceedingly poor taste in design, and to judge artists and architects as a class thereby, is hardly sportsmanlike. The several horrible examples of sham and gingerbread work cited proved merely that although a man may sign himself 'architect' and practice that profession, he is not really an architect unless properly trained for his work. Occasionally an engineer designs a bridge or other structure that has beautiful lines and proportions, as for example the Brooklyn Bridge, but more often we get the usual ugly type of highway or railroad bridge so common everywhere. They are generally well designed . . . but they are hardly things of beauty except when judged by the rule of 'handsome is as handsome does.'

"It does engineers no good to sneer at 'art' or architects because of isolated examples of bad design. The public is coming more and more to understand that rarely does the engineer put into his design the grace and beauty that the well trained architect can give. The writer believes there is glory enough for all in large work, and that the engineer can no more enter the field of the architect than an architect can do engineering."

This is the spirit that should exist between architects and engineers and we are glad to see it expressed. Intelligent men in both professions should endeavor seriously to bring about closer relations and eliminate petty professional jealousy.

JOINT REGISTRATION IN OHIO

THE Association of Ohio Technical Societies has prepared a bill for the joint registration of architects and engineers. All technical organizations in the state are asked to consider it and make suggestions to be discussed at a meeting of delegates prior to December first. It contains lengthy definitions of the practice of architecture and engineering to make certain that such definitions as would undoubtedly be required before its passage are intelligently phrased. Ohio architects and others interested should investigate the bill carefully in order to insure adequate consideration for the complicated phases of architectural practice. The bill is of a blanket nature following the practice of the medical and legal professions of giving uniform certificates for all branches.

BOOK NOTE

INDUSTRIAL HOUSING : With Discussion of Accompanying Activities, such as Town Planning, Street Systems, Development of Utility Services and Related Engineering and Construction Features. By Morris Knowles, Mem. A.S.C.E. New York : McGraw-Hill Book Co., Inc. Cloth, 6 x 9 ins.; 408 pp. Illustrated. Price, \$5.00.

Housing and town planning are still somewhat new to American architects and engineers. Its greatest activity took place during the war and hardly sufficient time has elapsed to allow for the preparation of seriously considered literature on the subject. The material available has been mostly in the form of scattered magazine articles or books written in view of English experience. This present volume, therefore, should meet a definite need.

The author had, previous to the war, a wide experience in municipal and utility engineering and direct association with the many problems of housing and town planning through his connection with government war housing as chief engineer of the Housing and Transportation Department of the Emergency Fleet Corporation.

The wide range of topics covered has imposed briefness on the author in order to compass the subject in a single volume. Directness of statement is, therefore, noticeable throughout and the many points are well illustrated with diagrams and photographs drawn from actual practice. A considerable number of useful cost figures are given including those showing total and percentage outlays for houses and for accompanying land, streets and utilities. Altogether the book is a practical and workable presentation of a complex subject. The architectural side of the problem is recognized and a number of interesting housing groups are shown in small illustrations, but the greater emphasis is placed on the land development and design and installation of utility features.



CAREFUL craftsmanlike attention to detail is apparent all through the magnificent Boston building of the Oliver Ditson Company shown herewith. Witness the floors, in complete accord with the restful, efficient tone of the rest of the building. *Gold Seal* Battleship Linoleum was the floor-covering selected—5,000 yards of this sterling value material were used.

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Gold Seal Cork Carpet—If absolute silence is demanded of the floor under consideration—use *Gold Seal Cork Carpet*. It is quietly comfortable, and restfully silent underfoot, with all the yielding springiness of a heavy carpet. We make it in soft shades of brown, green and terra cotta—with surface polished or dull—10 shades in all. Of course it is absolutely guaranteed—by the *Gold Seal* Guarantee.

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THE EDITORS FORUM



THE MODERN ORPHANAGE

TENDENCIES in the planning of institutional buildings, especially for children, have been changing very much in recent years. Most authorities are now agreed that such buildings should be planned on the "cottage system," which most nearly permits approaching normal home surroundings.

In this number we present illustrations and plans of one of the most recent orphanages to be erected — the Hutton Settlement at Spokane, Wash. It is of particular interest because of the special study the architects were able to give the problem before taking up the preparation of drawings. Mr. Harold C. Whitehouse, a member of the firm entrusted with the design of the buildings, visited the most important children's institutions of the country and by means of interviews with superintendents and personal observation of working conditions formulated a program for the development of the new orphanage based on the successes and failures of existing institutions. An ample fund and the desire of the donor of the buildings to erect a group that would be thoroughly modern made this detailed study of the problem possible. Mr. Whitehouse published the results of his investigations in two articles that appeared in *THE FORUM* for February and March, 1919.

PROPOSED PENNSYLVANIA BUILDING CODE

TODAY, when the cost of building is so serious a factor, architects should be alert to the possibilities of simplifying building procedure when such action will tend to reduce costs. An opportunity for such service exists in the formation of more reasonable building codes as suggested by an architect in this issue.

In this connection we would call to the attention of architects the preliminary plans now under way for drafting a building code for the State of Pennsylvania. Recently a conference called by Clifford B. Connelly, Commissioner of the Department of Labor and Industry, voted in favor of the State Industrial Board making a tentative draft which would be submitted to public hearings in various parts of the state.

A committee has now been appointed to start the project. James B. Cronin, member of the Industrial Board, Keystone Building, Harrisburg, Pa., is chairman and D. Knickerbocker Boyd, 1700 Walnut street, Philadelphia, an architect member.

There should be no attempt made to lessen in any way requirements necessary for safe and adequate construction, but in view of existing difficult conditions every effort should be made to determine regulations that will permit of the economical use of material and especially to rule out provisions based on political preferment for which many existing codes can be justly criticized.

UNITED STATES CHAMBER OF COMMERCE TAKES UP HOUSING

THE gradual realization that our national housing shortage is a serious hindrance to the proper social and business growth of the country is noticed in the recent formation of the Civic Development Department of the Chamber of Commerce of the United States. Mr. John Ihlder, the well known housing specialist, has been appointed head of the Department which gives assurance that in its efforts to assist in solving the problem the Chamber will have a practical knowledge of conditions. Mr. Ihlder's interest in housing and civic affairs was aroused in 1903 while he was an editorial writer on the Grand Rapids *Evening Press*.

BOOK NOTES

MEMOIRS OF THE AMERICAN ACADEMY IN ROME.
Volume III, 102 pages, 91 plates, 10½ x 13½ inches. New York: University Press Association. Price \$8.

The major portion of this latest volume from the American Academy in Rome provides a complete catalog of the Bernardini Tomb, the contents of which are exhibited in the Museo Preistorico. This is one of the most important of the tombs erected by the Etruscans during the VII century B.C. and inasmuch as only by the preservation of these tombs and their excavation, which was undertaken in the last century, are we enabled to know anything of the art or civilization of these people, this careful compilation of its treasures is of great value to the archaeologist.

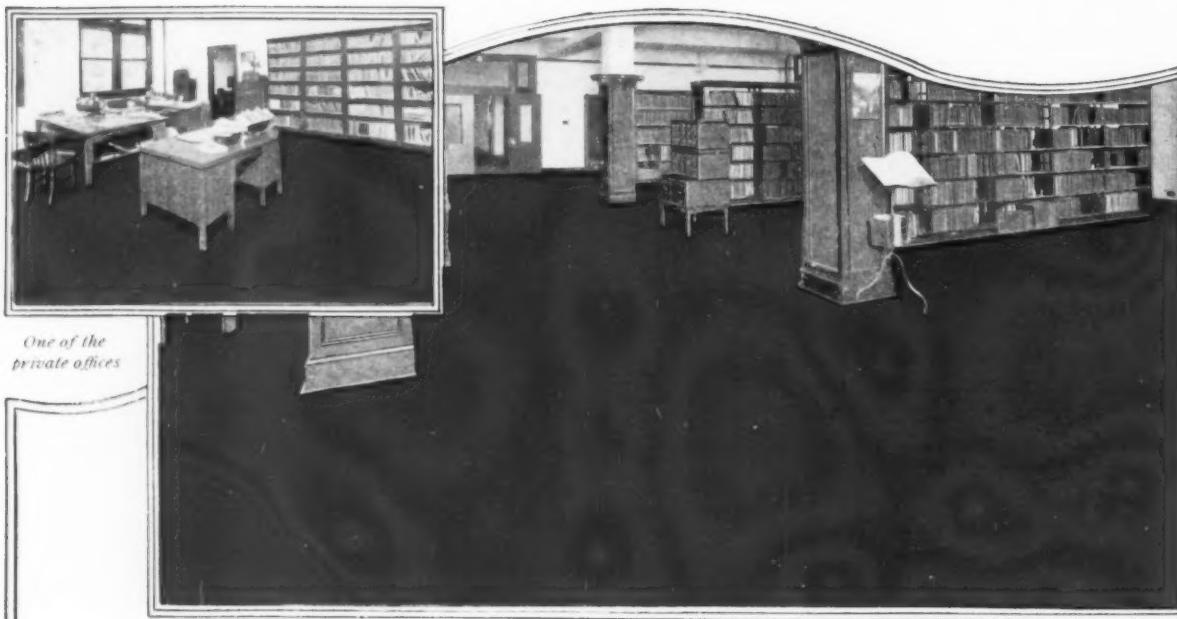
HANDBOOK OF FIRE PROTECTION, by Henry A. Fiske, Everett U. Crosby and H. Walter Forster. New York: D. Van Nostrand Company. Price \$4.

The sixth edition of the Crosby-Fiske-Forster Handbook on Fire Protection is a practical and interesting reference volume for the architect's working library.

This publication contains complete information regarding the details of planning, construction and equipment covering elements of design to check the spread of fire; protection equipment, including all phases of the automatic and open sprinkler problem; signaling systems, and watchmen's service. The publication is well indexed and should serve as a valuable handbook to the architect who wishes to gain knowledge in any phase of planning in which the menace of fire is a consideration.

A CORRECTION

Through an error the design of the apartment house at 863 Park ave., New York, illustrated on page 189 of the November issue, was credited to Mr. Charles A. Platt. Mr. George Mort Pollard is the architect of this building and we regret that it was not so mentioned.



Gold-Seal Battleship Linoleum in Library of School of Mines, University of Minnesota, Minneapolis

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Architects should write for a copy of our new book on NATCO HOMES. It shows some mighty attractive moderate priced homes, with descriptions and floor plans.

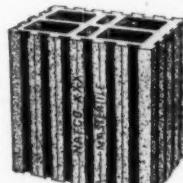
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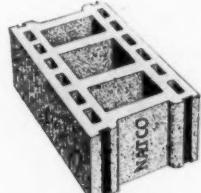
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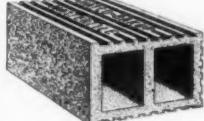
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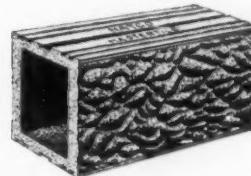
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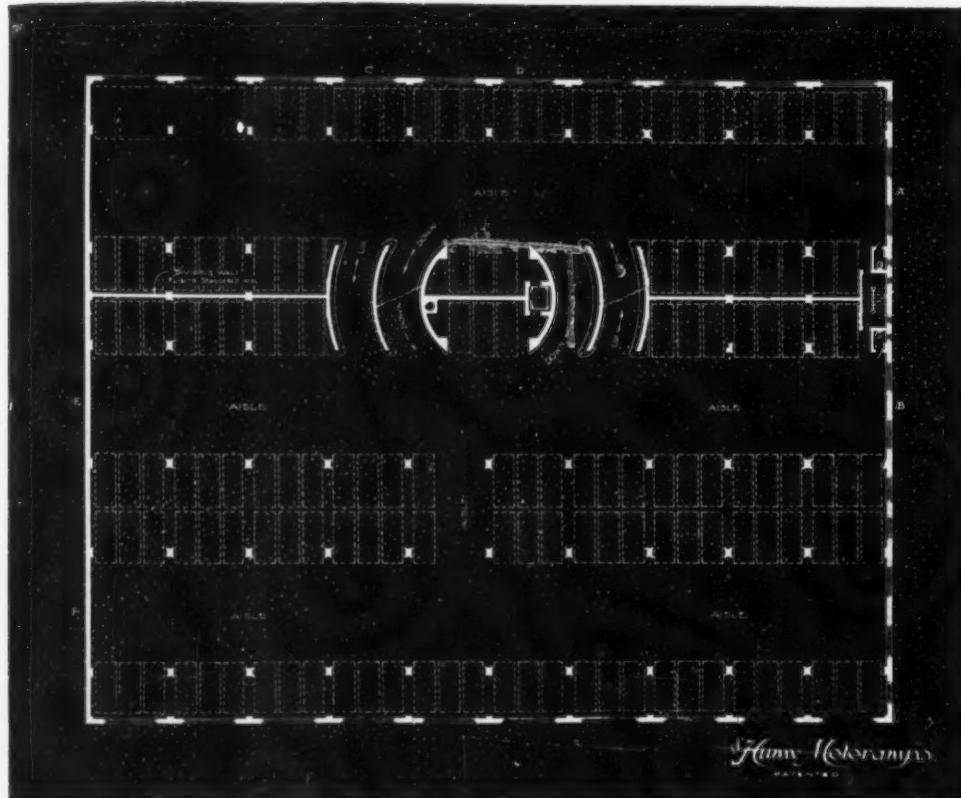
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Drawing by Hugh Ferriss

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March 26th to April 2nd, 1921***and***The Third "Own Your Home" Exposition to be Held in New York,
April 16th to 30th, 1921**

This Competition has the approval of the American Institute of Architects, and will be conducted through the leading Architectural journals by Henry K. Holsman, A.I.A., President of the Illinois Chapter of the American Institute of Architects, 175 West Jackson Boulevard, Chicago, as Architectural Adviser.

Article I.—Object

To stimulate the building of more and better homes by (1) securing a large number of well planned economical four, five and six room house designs, to be built in frame, brick and stucco; (2) publishing them in a book to be advertised and sold at the Expositions and at book stores at a price sufficient to cover the cost, from which the home builder can select the one best suited to his location, requirements and taste; (3) making good architectural drawings and specifications that may be duplicated and sold to owners, architects or builders at a nominal price not to exceed \$25 a set.

Article II.—Stages of the Competition

The Competition will be held in three stages:

- 1st stage, a 4-room house in wood, brick or back plastered metal lath and stucco.
- 2nd stage, a 5-room house in wood, brick or back plastered metal lath and stucco.
- 3rd stage, a 6-room house in wood, brick or back plastered metal lath and stucco.

The Competition drawings for the first stage will be due January 24th, 1921; for the second stage January 31st, 1921, and for the third stage, February 7th, 1921. Any architect or firm of architects in the United States, except the Architectural Adviser, may submit drawings for prizes in one or all stages. Competitors in each stage may submit designs for either wood, brick or stucco, or for any or all of them.

Article III.—Primary Cash Prizes

\$3,600 in prizes will be awarded as follows:

	1st Prize	2nd Prize	3rd Prize	4th Prize	4 mentions
For Frame house..	\$500	\$250	\$150	\$100	at \$50 each
For Brick house..	\$500	\$250	\$150	\$100	"
For Stucco house..	\$500	\$250	\$150	\$100	"

Secondary Cash Prizes

In addition to the above prizes, \$1,200 will be awarded:

For the best three 4-room designs shown in each material by one competitor	\$400
For the best three 5-room designs shown in each material by one competitor	\$400
For the best three 6-room designs shown in each material by one competitor	\$400

Article IV.—Other Prize Considerations

Thirty or more designs will be selected for publication in book form. A condition of the competition is that each contestant whose design receives a prize or a mention, or is selected for publication, shall prepare within a reasonable time upon demand, a complete set of working drawings and specifications in accordance with standard regulations to be given later. \$100 will be paid, in addition to the prize awarded, for each set of working drawings and specifications upon their receipt, and \$15 additional will be paid on account of each set of prints sold from the original set.

All designs awarded prizes or selected for publication, and all working drawings and specifications received will become the property of the contributors of prize money as their interest may appear, and will bear the author's name and address as architect, but nothing in this agreement shall prevent the author from making any individual use of his design that he may desire.

Article V.—Conditions of the Lot

For all competitions assume a level lot 40 feet by 100 feet in a small town or city, or a suburb to a large city, either (1) on a corner, or (2) inside and having practically no detrimental encroachments on either side, or (3) with an encroachment of a neighboring house within 1 foot of one side of the inside lot.

Article VI.—Requirements of the House

Assume a home for an American family of good taste, small means, and no servants, desiring to make a charming home with (a) beauty of design obtained by harmony of line, color, and proportion, and simplicity of treatment of the house and grounds, (b) the maximum of comfort in summer and winter, (c) the maximum of housekeeping facility and convenience for all phases of indoor and outdoor family home life, and (d) the minimum exterior and interior upkeep and operating expense, and (e) the minimum of cost consistent with a, b, c and d.

Article VII.—Drawings

Submit drawings in black ink on unmounted white paper, 20 inches by 26 inches within plain black border line 1 inch from all edges. Show one design in one-material only on each sheet, consisting of (1) a pen and ink perspective of the house and grounds projected from $\frac{1}{4}$ inch scale plans, with the picture plane at the nearest corner of the house, without wash or color, with shadows and planes rendered in values as true to nature as possible; (2) floor plans at $\frac{1}{2}$ inch scale, walls and partitions blocked in solid, and showing closets and 4'6"x6'6" beds and 1'8"x3'6" dressers in all bedrooms, full size bed davenport in living room, 2'6"x5' bathtub, a lavatory and a water closet in bathrooms, a 4'x4'6" table in dining rooms, a kitchen sink, and stove, and ice box and laundry trays, and heating apparatus, and no other furniture or fixtures, all drawn to true scale in proper location on the plans; all plans having outside dimensions and the size and the names of rooms and the size of closets and pantries plainly marked thereon; (3) plan of treatment of grounds either in connection with the ground plan or on a smaller scale plot plan; (4) a small cross section giving grade line, cellar and room ceiling and roof heights; (5) in a space within the border lines give a computation of cubage measured from outside of walls, from cellar floor (or from bottom of footing where no cellar exists) to one-half the height of the roof, measured from plate to ridge, figuring one-half of cubage for porches projecting beyond the bearing walls, and full cubage for porches within bearing walls, and give, in the same space, notes suggesting color schemes or other treatment of walls and roof.

All letters and figures should be simple block letters large enough to permit a three-quarter reduction in reproduction.

Article VIII.—Anonymity and Transmissions

No name or mark or sign shall be placed on the drawings or on the package containing them by which the author may be identified (if the sender's name and address be required on the package as in mail or express, a name of a representative may be substituted for that purpose). Drawings flat or rolled shall be packed so as to prevent creasing or crushing in a sealed package containing an opaque sealed envelope containing the full true name and address of the author and delivered to Henry K. Holsman, Architectural Adviser, Own Your Home Competition, 175 West Jackson Boulevard, Chicago, Illinois, on or before the date set for the close of the respective stages of the Competition. (See Article II.) Packages thus addressed will be opened and each sheet and the envelope therein given a distinctive mark. The envelope will be kept by the Architectural Adviser, unopened, until the awards are made by the Jury.

Drawings are at the author's risk until returned, though reasonable care will be taken in their handling and keeping. Drawings not receiving prizes or not selected for publication, will be returned to their respective authors.

Article IX.—Jury of Award

The Jury will be composed of five architects representing different sections of the country, nominated by the leading architectural journals, and selected by the Architectural Adviser; assisted by three practical builders, chosen by the Architectural Adviser, who will act as advisers to the Jury on cost, economy of construction and maintenance.

The Jury will meet in Chicago or some other city, organize and devise a scheme of points, considering (a) the relative difficulty of the assumed lot (1, 2 or 3, Article V) in the ratio of 20-30-50 respectively; (b) the merit of design (a, b, c, d and e, Article VI) in ratio of 20-10-10-30-30 respectively; (c) the merits of plan and integrity of presentation (1, 2, 3, 4 and 5, Article VII) in ratio of 10-40-20-10-20 respectively; and other points as they may deem best and award the several prizes according to this program, provided that no prize will be awarded any design which the Jury deems unworthy or violates the express provisions of this program. The Architectural Adviser may be present at the Jury deliberations, but will have no vote.

Article X.—Further Information

Information and details on the proper use of materials will be forwarded to architects upon receipt of their names and addresses.

Address all communications to:

HENRY K. HOLSMAN,
Architectural Adviser,
175 West Jackson Boulevard,
Chicago, Illinois.



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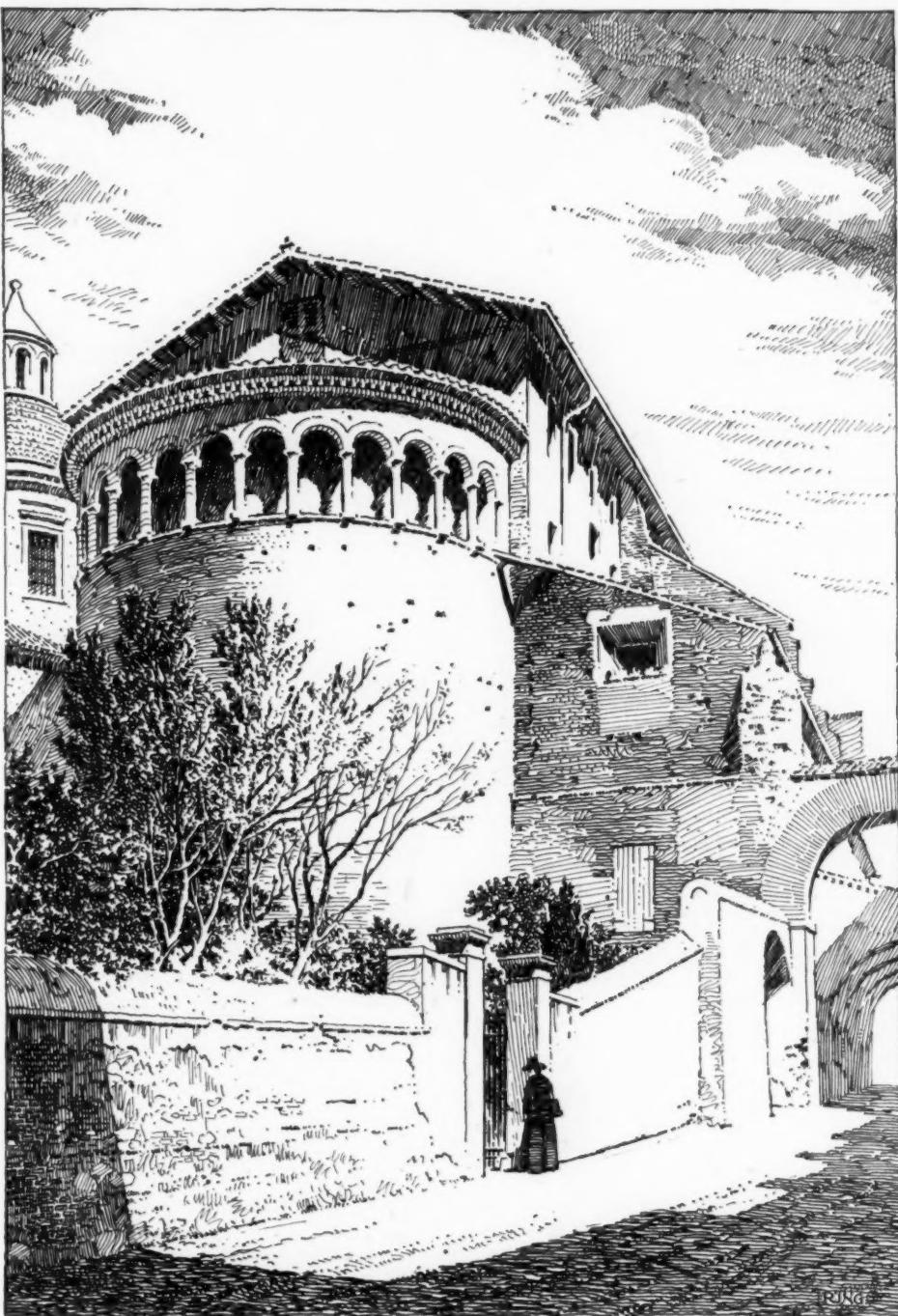
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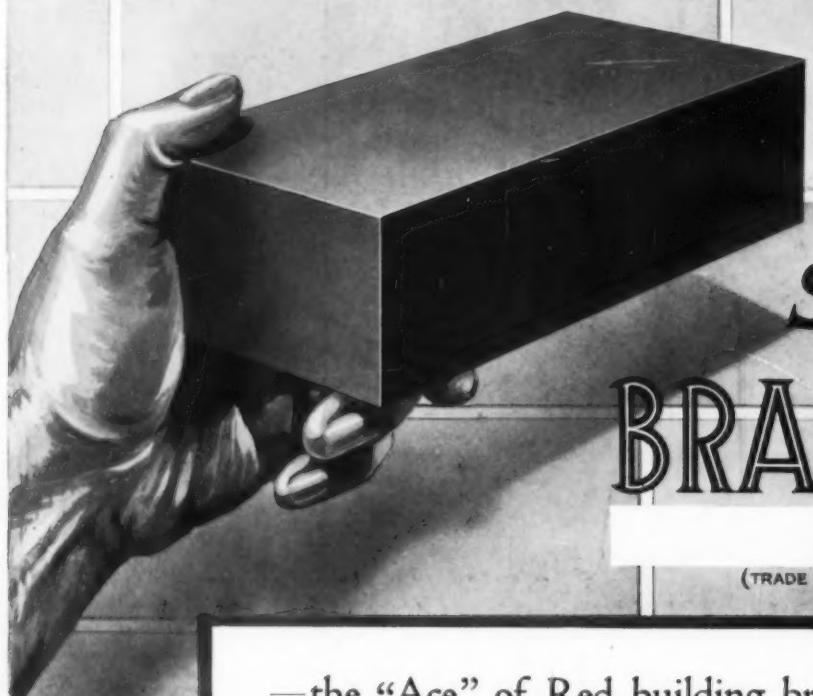
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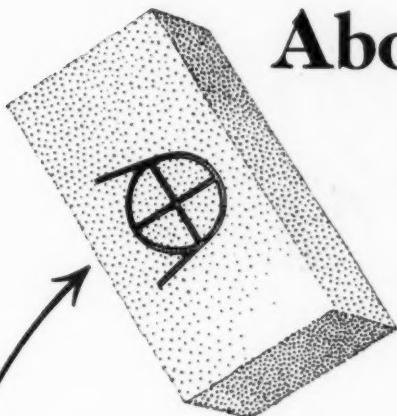
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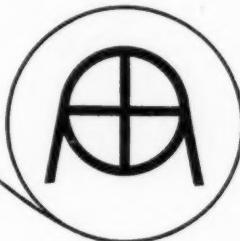
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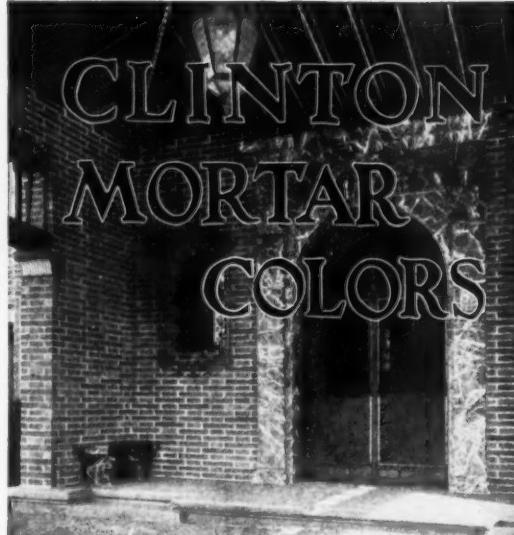
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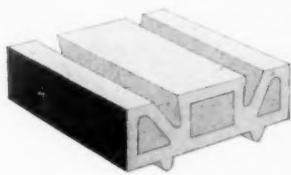
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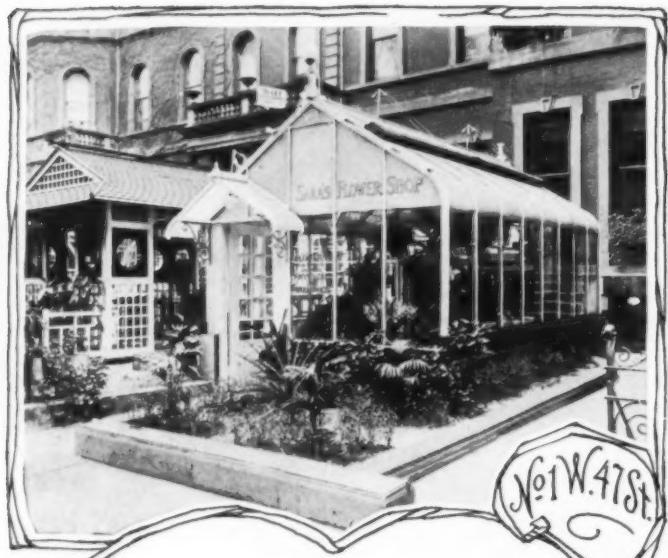
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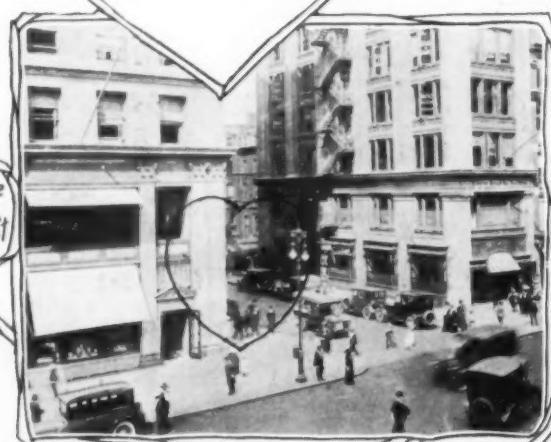
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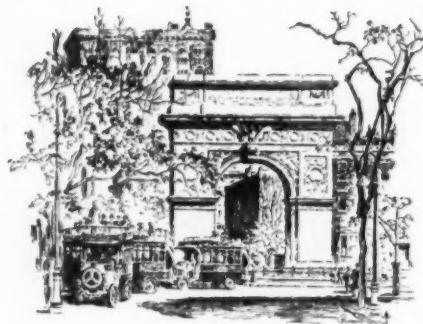
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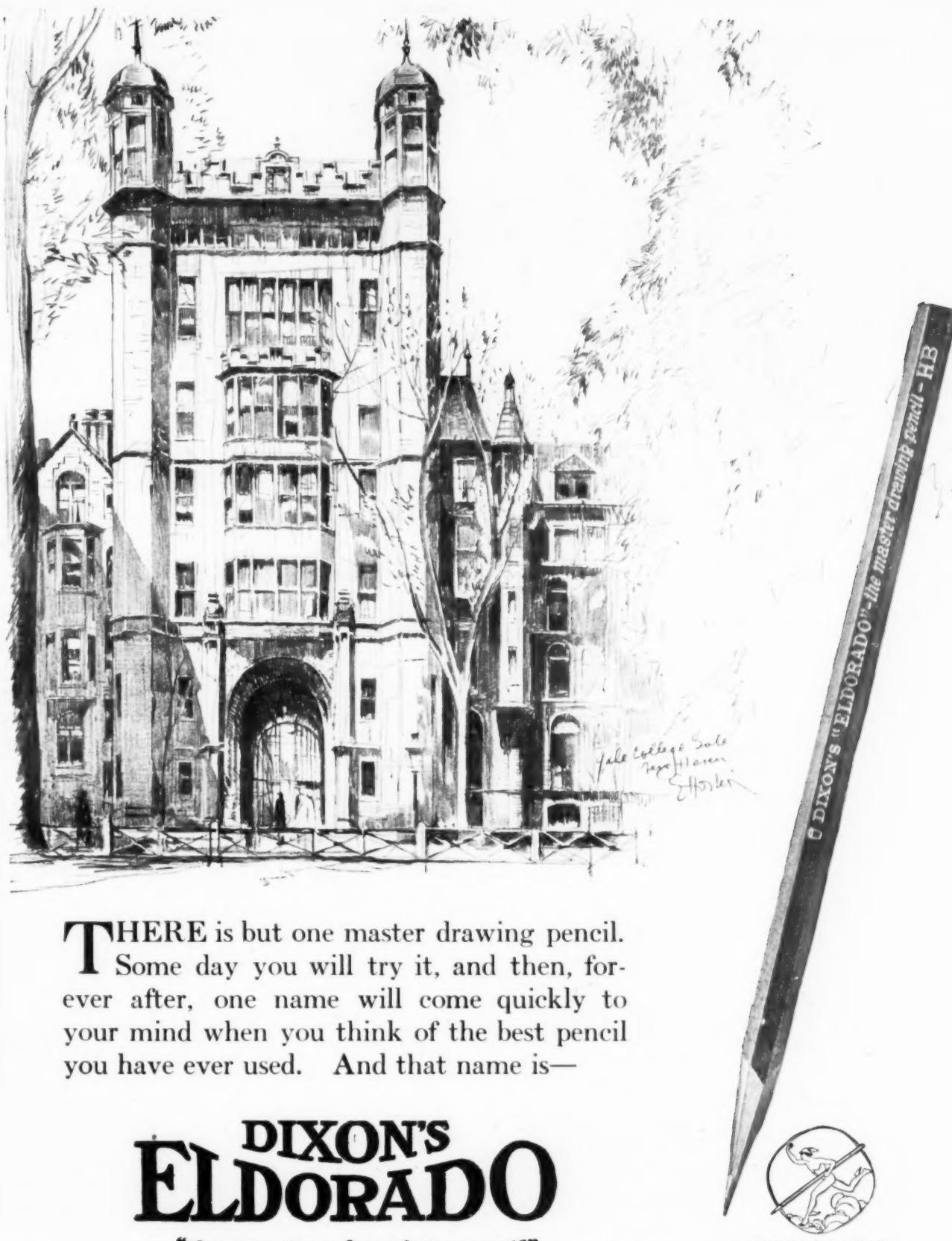
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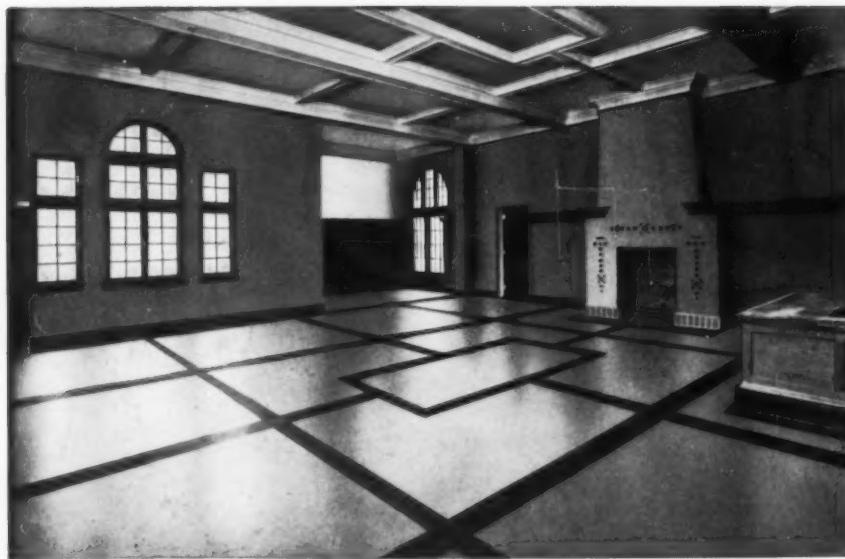
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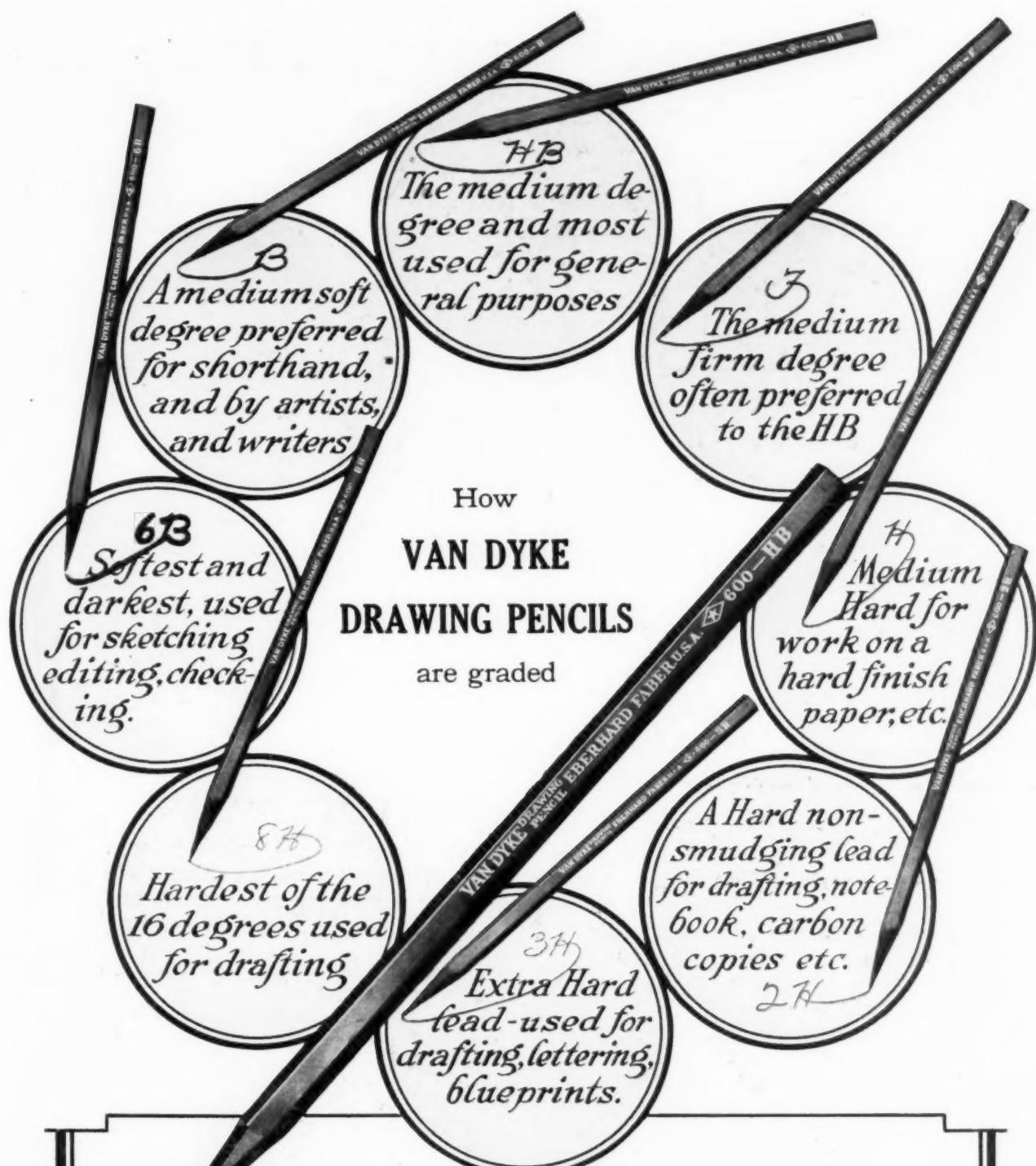
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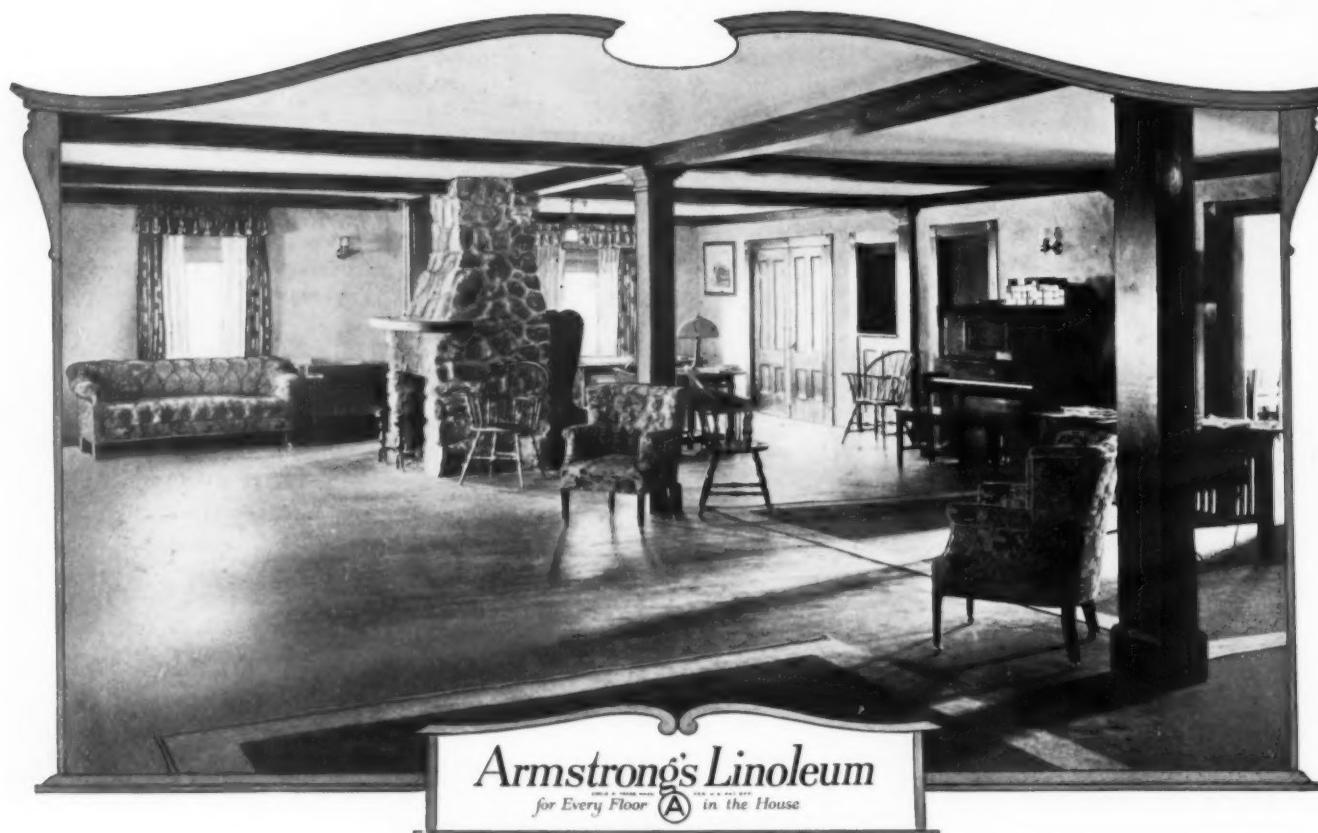
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A floor of Armstrong's Plain Brown Linoleum in the Ferguson Hotel, a quaint New England resort in Hyannis, Mass.

Compare the Cost of Linoleum Floors

A COMPARISON of floor costs brings to light some interesting facts. The following table shows that Armstrong's Linoleum Floors are as low in first cost, and in many cases lower, than other floors, lacking the particular advantages of permanent linoleum floors *cemented down over deadening felt paper*:

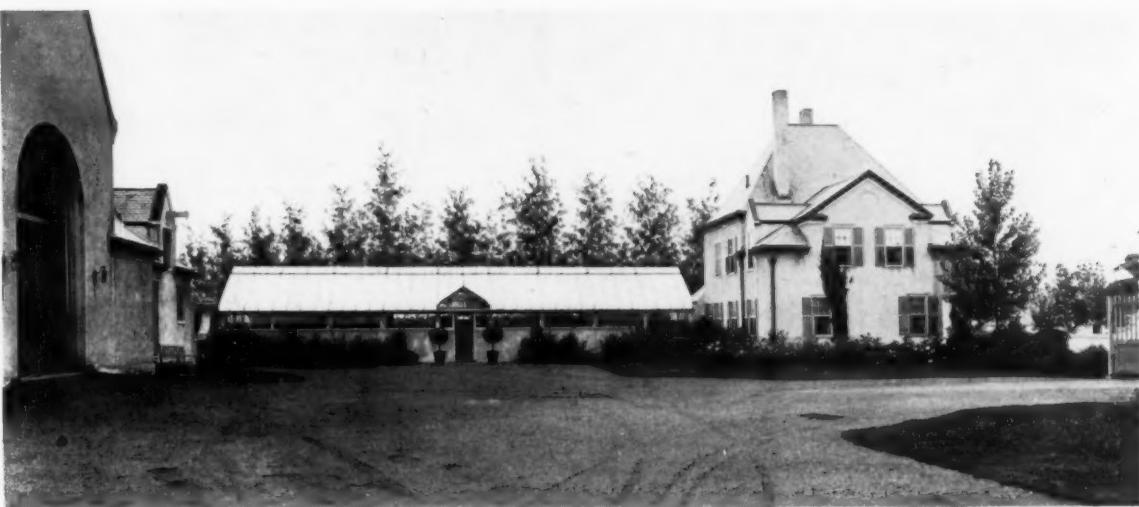
BUSINESS FLOORS	Cost per sq. ft. cemented over felt paper	RESIDENCE FLOORS	Cost per sq. ft. cemented over felt paper
Battleship Linoleum		Parquetry Inlaid Linoleum	\$.38
1/4-inch brown	\$.45	Hamilton Straight Line Inlaid	
1/4-inch green . . . . .	.49	A Grade . . . . .	.33
1/4-inch gray . . . . .	.49	D Grade . . . . .	.25
3/16-inch brown . . . . .	.34	Carpet Inlaid Linoleum	.26
3/16-inch green . . . . .	.36	Plain Linoleum - B Grade	.27
3/16-inch gray . . . . .	.36	Jaspe Linoleum	
Parquetry Inlaid Linoleum	.38	A Grade . . . . .	.35
Hamilton Straight Line Inlaid		B Grade . . . . .	.31
A Grade . . . . .	.33	Granite Linoleum	.30
Plain Linoleum - A Grade	.30	Printed Linoleum	
Jaspe Linoleum		D Grade . . . . .	.21
A Grade . . . . .	.35	E Grade . . . . .	.20
B Grade . . . . .	.31		
Terrazzo	\$.80	Composition	\$.45
Marble	\$ 1.50 to 2.00	Tile	\$ 1.00 to 1.75
Oak Flooring, 3/4-inch	\$.46		

The above figures were based on prices current in Lancaster, Nov. 15, 1920.

The architect who is not thoroughly familiar with modern linoleum floors will further his own interests, as well as his clients', by making a thorough investigation of this subject. The double-tone Jaspe effects, the new Inset Tiles, and the soft, pleasing Plain colorings of Armstrong's Linoleum permit a wide latitude in decorative treatment while the inherent qualities of the material assure a warm, quiet, durable floor.

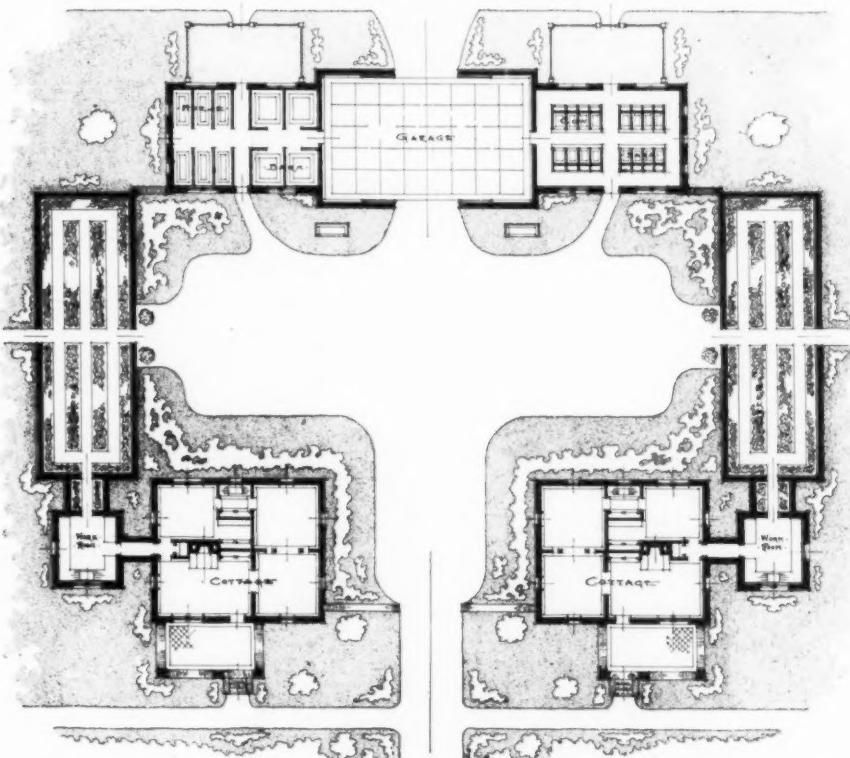
A new edition of "Armstrong's Linoleum Floors," just off the press, takes up all these points in detail. This book is published in the convenient form recommended by the American Institute of Architects, and contains, in addition to tables of gauges and weights and other information of specific interest to architects, colorplates of fine interiors and lithographs of modern linoleums in full scale. A copy is yours for the asking.

Armstrong Cork Company, Linoleum Department, Lancaster, Pa.



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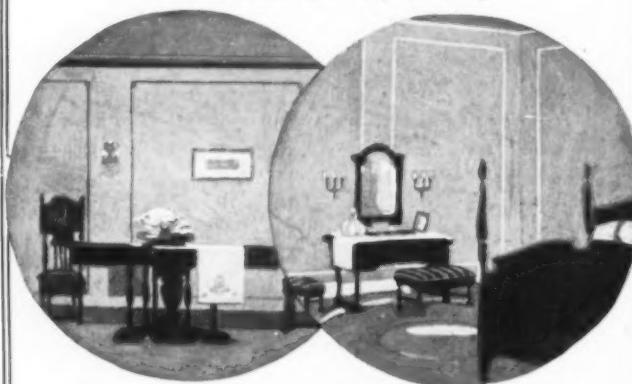
Architects who are accomplishing things have little time to experiment with unknown interior finishes—you want to find a thoroughly reliable one, standardize on it, and recommend it to your clients. You prefer to know rather than to hope, that the interior finish will be all you and your clients expect of it.

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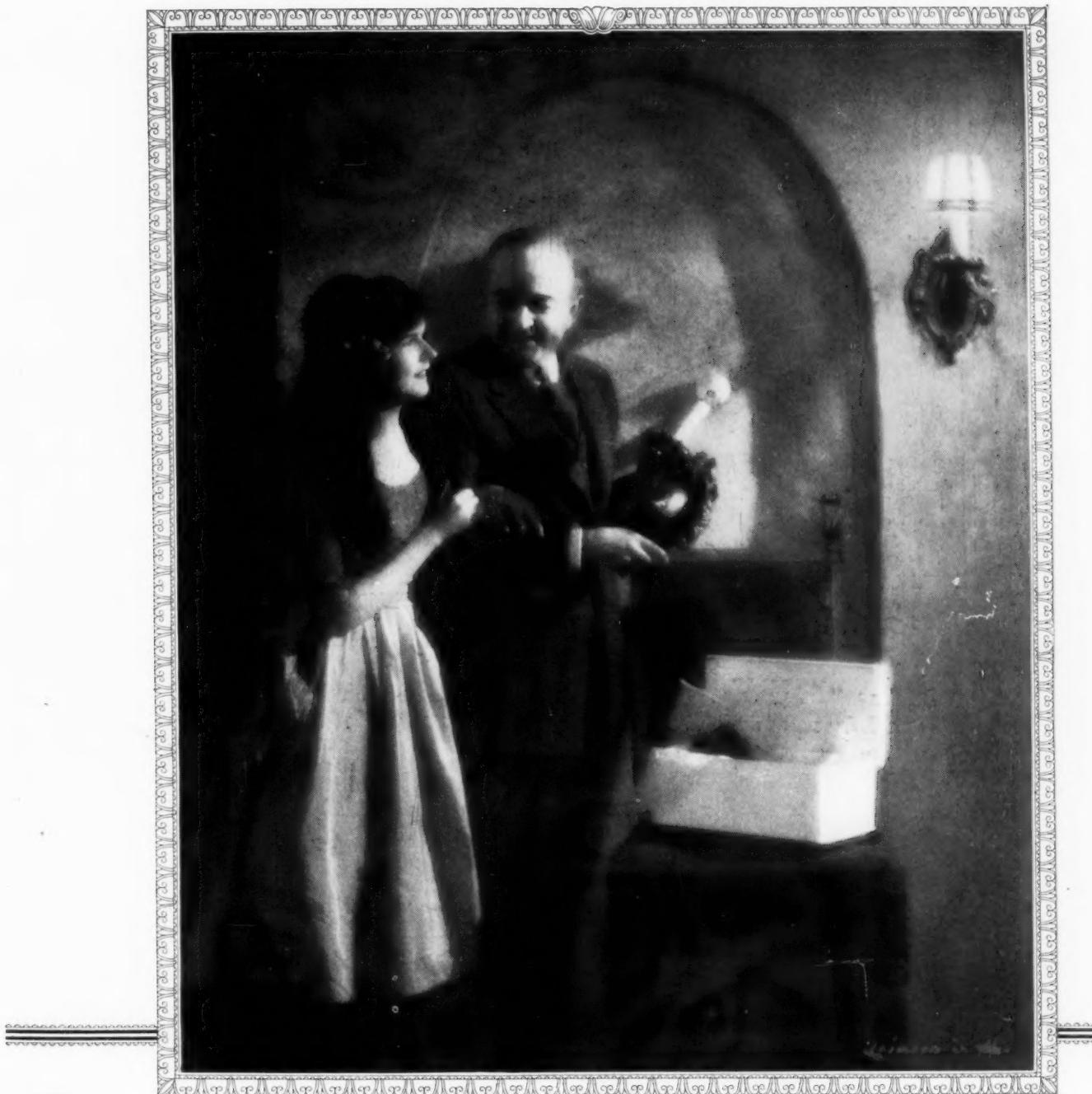
THE rich beauty of American Walnut is but one of many reasons for its employment for broad panels, long mouldings and handsome furniture, as in the magnificent room pictured above.

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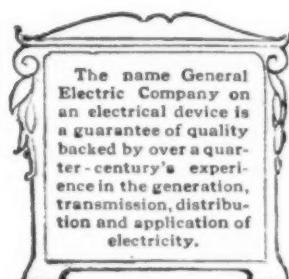
MOST old houses are found to be "underwired," when modern household appliances are introduced. They have not been provided with sufficient outlets, or the wires are not heavy enough to carry this new load.

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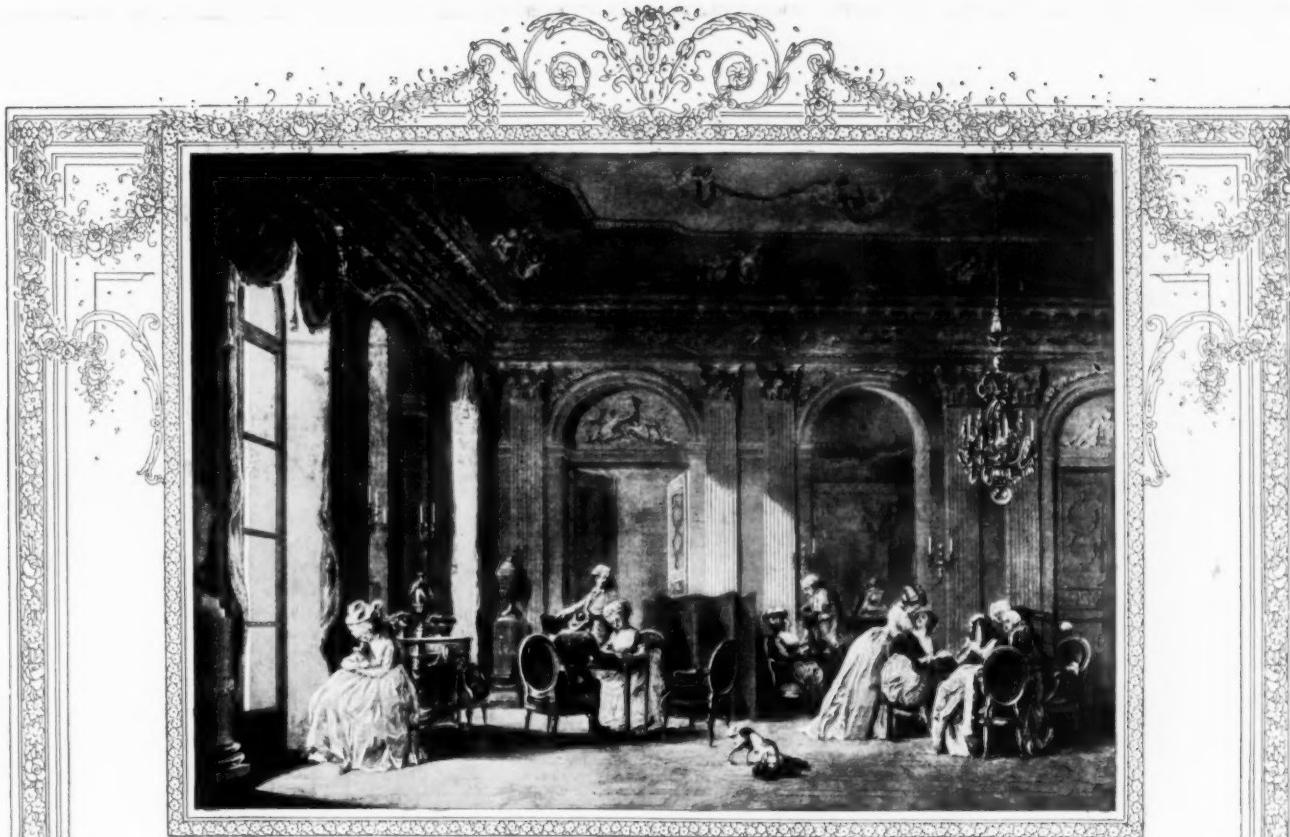
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L'Assemblée au Salon. An engraving by Degueauviller from the painting by N. Lavoine

THE GENESIS of the MODERN DRAWING ROOM

ANCESTORED at once by France and by England, through Grand Salon as by family sitting room, the modern drawing-room is the product of sources which, widely differing, owe their origin to a single root.

The Drawing-Room sprang from the Great Hall (the "Grande Salle," as it was called in France) where Barons and their retainers roistered and from whose freer pleasures the ladies at some time found it convenient to withdraw. Thus in England came the Withdrawning Room which, originally the bedchamber of Lord and Lady, came later to be screened off and apportioned to the Lady and her damsels.

Parallel with this development came that in France—and here we see the nobleman ceremoniously disporting himself in his Grande Salle, and more socially in his bedroom. Then, to this latter room came to be introduced, after the example set by Italy, the Cabinet. And from these rooms it was that, at the beginning of the 18th century, came the definite divisions, Salon

de la Compagnie and Salon de la Famille—the last becoming the family apartment, like the English drawing-room.

The drawing-room at its most beautified supremacy was probably represented by the Grand Salon of the Court of Louis XV. Here it was at its most stately and vivacious phase—though lacking the caprice, the intimacy of the modern drawing-room. This latter, with its soft color, the informality of its arrangements, and its beautiful investitures of decorative art has more and more combined the beauty of the Salon de la Compagnie with the comfort of the Salon de la Famille; and in this development of decorative beauty as of humanizing influence, silks have borne their satisfying share.

In this regard, too, it may be truly said that the beautiful decorative silks produced by Cheney Brothers—particularly those typical of the various Louis periods—have entered importantly into the development of the drawing-room as we know it in America today.

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It is insulation's job to minimize this. And so well is this being done by the Johns-Manville Insulation Service that the materials applied are paying for themselves by the heat they save.

This kind of Heat Conservation has become a science.

In past years little was known of the real truths of heat loss. Materials were recommended after inadequate tests; in fact, today if many of the steam pipes covered sometime ago with materials of unknown value were checked up, their covering would be replaced by insulation of known value, and new records for economy set up.

Rising fuel prices make heat losses doubly serious and economy in heat transmission has been realized to be a real factor in cutting heating, power and manufacturing costs.

Changing the physical design of Insulation

An insulation to be of maximum value must have more than the property of preventing heat loss. It must also have physical durability, for a short-life material means early replacement, so that if insulation values are equal, the most durable insulation is the most economical.

It is desirable to reduce a loss, it is surely advisable to reduce the loss to a minimum. Believing this, Johns-Manville developed physically strong-felted insulations—and with obvious advantages to the fuel user. For these felted insulations are built up in ply form, physically strong and not easily damaged by vibration, handling or rehandling. These improved materials have not only overcome the physical shortcomings of most insulations, but made higher heat efficiencies possible. In fact, on test, one of these insulations has repeatedly been shown to be the most efficient commercial material in existence.

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No one material should or will serve all practical needs. Steam service where high pressures are used demands different treatment than cold water or brine service. Johns-Manville, in realization of this, offer materials suitable for use indoors and out; overhead and underground and for every type of system, and not only does this service include the furnishing of the materials but their application as well.

The application of an insulation is vital to its performance in service, hence the necessity of controlling this factor if economical results are to be obtained.

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3"	91.1	92.5	93.5	94.5	95.4

What Insulation Efficiency Means

90 per cent efficiency,—for instance,—means that the insulation of that efficiency saves 90 per cent of the heat that would be lost if the insulation were not applied.

Example:

One hundred feet of uncovered 3" pipe conveying steam at 150 pounds pressure through a room whose temperature is 70° F. loses 1,222,000,000 B. t. u. (units of heat) per year. An insulation 90 per cent efficient saves 90 per cent of this loss, or 1,099,800,000 B. t. u. (units of heat).

The equivalents of this loss and saving in pounds of coal are: LOSS—122,200 lbs., or 61.1 tons coal; SAVING by Insulation—109,080 lbs., or 55 tons coal.

The figures on pounds of coal lost due to uninsulated pipe and saved by use of insulation are based on continuous operation, 24 hours per day, 365 days per year and 10,000 B. t. u. available per pound of coal.

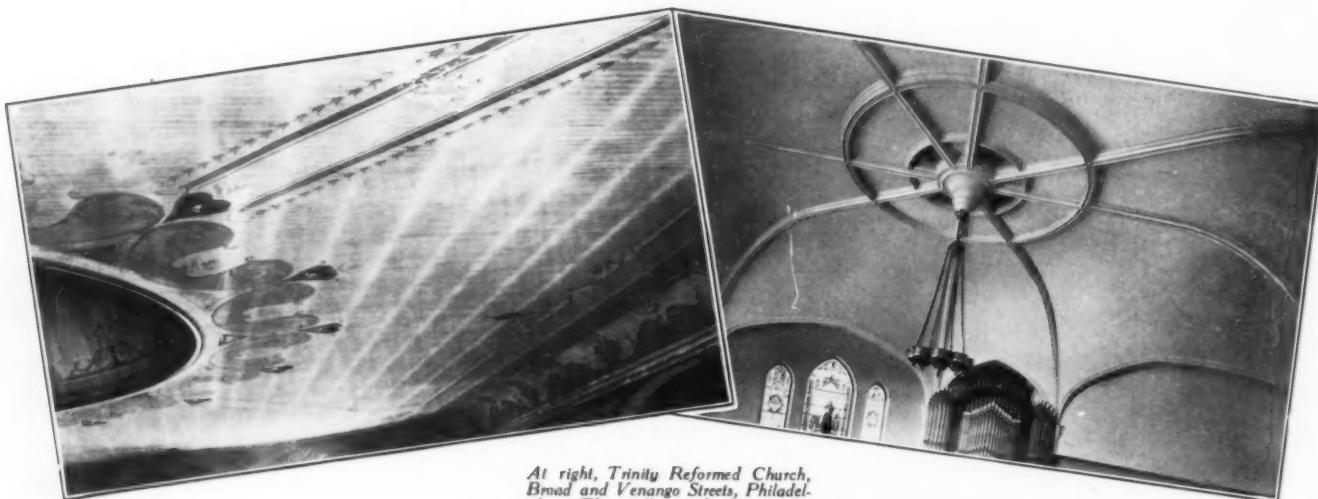


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life. Nothing to break, crack or
powder off as in molded materials.

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that save power waste
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FIRE PROTECTION PRODUCTS

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Serves in Conservation



At right, Trinity Reformed Church, Broad and Venango Streets, Philadelphia. There will never be dust streaks, stains or cracks on this ceiling because Bostwick "Truss-Loop" Metal Lath was used as the base for the plaster. Compare this with the ceiling of a Warren, Ohio, church shown at left, where each wood lath shows through the plaster.

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Take, for instance, the carefully planned surfaces and sweeping lines of wall and ceilings. Entrust these to lath which can sag or easily loosen its grip on the plaster coating and, at any time, the beauty of your design may be destroyed, your hours of painstaking creation gone to naught.

Bostwick Truss-Loop Metal Lath, with its rigid steel trusses and unyielding loops, can never sag, and it actually requires a hammer to break away plaster, once it is hardened in its triple grip.

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THE BOSTWICK STEEL LATH COMPANY, Niles, Ohio

THE ARCHITECTURAL FORUM

VOLUME XXXIII

NUMBER 6

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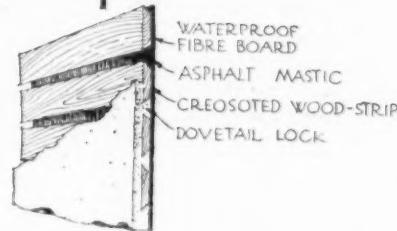
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Residence of J. C. Fahey,
(Guilford) Baltimore, Md.
Wm. D. Landin, Architect.
Bishopric Stucco Board used
on Exterior.

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Manufacturers' Catalogs and Business Announcements

ANNOUNCEMENTS

Mr. James G. Mackenzie, Jr., architect, announces the removal of his office from 15 East 40th street to 4 East 39th street, New York City.

Mr. Edwin F. Simpson and Mr. Rolland L. Githens announce the formation of a partnership for the practice of architecture with offices at 869 Reibold Bldg., Dayton, Ohio.

The partnership heretofore existing between Walter F. Ballinger and Emile G. Perrot, trading as Ballinger & Perrot, has been dissolved. The business will be succeeded to and continued by Walter F. Ballinger, trading as The Ballinger Company.

Messrs. Shaw & Hepburn announce the removal of their offices to 24 Mt. Vernon street, Boston, Mass.

Resolutions were adopted by the Executive Committee and Advisory Board of the National Pipe and Supplies Association at their fall meeting, held in New York on Thursday, November 11, accepting the terms employed by the American Society for Testing Materials in differentiating between iron and steel pipe. In distinguishing the variety of pipe as welded, drawn, cast, etc., it is recommended that the designation "wrought" which has crept into the pipe industry in the sense of making or forming by labor shall apply only to that well known method of preparing iron as a material.

CATALOG REVIEWS

THE HOLLOW BUILDING TILE ASSOCIATION, Conway Building, Chicago, Ill.
"Handbook of Hollow Tile Construction" (8½ x 11 ins.). 110 pp.

The leading manufacturers of hollow tile united for the purpose of producing a nation wide building tile of high standards submit this substantial book as a guide to its uses. From bonding to the fireproofing of structural steel, the extensive employment of this material is shown, both in place of and with other types of construction and also as the sole element of building. Practically all of the problems that the user of hollow tile might face are eliminated by the clearly reproduced details and explanatory text. Under the trade mark "Mastertile" are embraced variety enough of pattern and shape to produce structures of any class. Besides the many things that are expected to be found in a handbook of this sort, there are model specifications, definitions of terms of the trade, character-

istics of hollow tile and a request to take advantage of the association's research department.

"Hollow Tile for the Home" (8 x 10½ ins.). 48 pp.

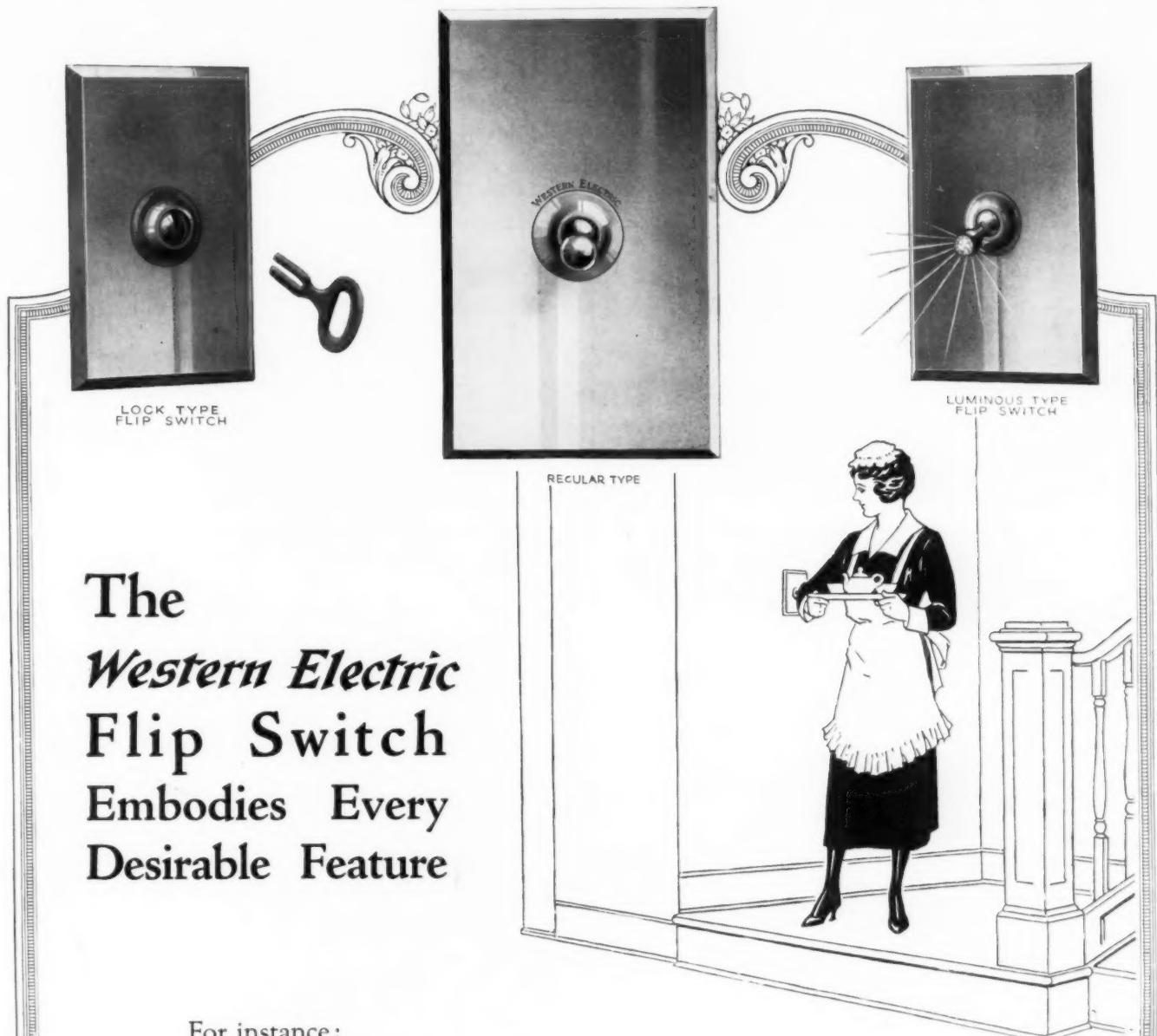
A pictorial account of the work in which hollow tile has been used and a discussion of materials and conditions. "Mastertile" is shown in detail drawings, and sectional walls and photographic illustrations display executed houses in many styles. The entire layout is one that is directed toward and would be of interest to the layman who is about to build.

ARCHITECTURAL AND BUILDING CODE SERVICE,
NATIONAL LUMBER MANUFACTURERS ASSN.,
750 McCormick Bldg., Chicago, Ill.
"Frame Construction Details" (8½ x 11 ins.).

A welcome volume makes its appearance in the form of a series of plates devoted to the wooden structure or more properly its structural parts. Many designers have felt the need of such a book and have not known where to obtain one. The examples set are sponsored by an able staff who would naturally be the most fitted to attempt this sort of work. The details are classified by types and their component parts as the "balloon frame," "braced frame" and "Western frame." Minor points are clearly shown, sizes are at once apparent, all cuts are readily understood and such work as fire-stopping is complete at every point. The aim of the compilers is to give the efficient as well as the economical practices which will make a helpful reference to estimators. Copies of the book may be secured from the above address at a cost of one dollar each.

THE MAGNESIA ASSOCIATION OF AMERICA, Secretary, Bulletin Building, Philadelphia, Pa.
"Defend Your Steam" (8 x 11 ins.). 80 pp.

Opening with a short recognition of James Watt's part in the development of "heat work," this book contains an extensive treatise on the protection of steam as applied to power and heating. The scientific work of the Mellon Institute of Industrial Research in co-operation with the above association in checking the insulation properties of magnesia records tables, diagrams and data for the use of architects and engineers. Following a dissertation on the advantages of "85% Magnesia" as a material, many very convincing installations of this material are shown. Durability of this agent as a pipe and boiler covering is made a stellar point through the declaration of important tests by such authorities as the U. S. Bureau of Mines. A list of notable users of "85% Magnesia is appended."



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Selected List of Manufacturers' Literature

FOR THE SERVICE OF ARCHITECTS, ENGINEERS, DECORATORS AND CONTRACTORS

The publications listed in these columns are the most important of those issued by leading manufacturers identified with the building industry. They may be had without charge, unless otherwise noted, by applying on your business stationery to *The Architectural Forum*, 142 Berkeley St., Boston, Mass., or the manufacturer direct, in which case kindly mention this publication.

Listings in this Department are available to any manufacturer at the rate of \$5 per listing per month.

BOILERS—See Heating Equipment

BRICK

American Enamelled Brick and Tile Co., 52 Vanderbilt Avenue, New York.
Enamelled Brick Circular. Illustrated.

American Face Brick Association, 1151 Westminster Bldg., Chicago, Ill.

The Story of Brick. Booklet. 7 x 9½ in. 55 pp. Illustrated. Presents the merits of face brick from structural and artistic standpoints.

The Home of Beauty. Booklet. 8 x 10 in. 72 pp. Color plates. Presents fifty designs for small face brick houses submitted in national competition by architects. Text by Aymar Embury II, Architect.

Bradford Brick Co., 2 Main Street, Bradford, Pa.
"Red" Catalog. 7½ x 5 in. 30 pp. Illustrated. Covers dry pressed and impervious smooth-faced brick.

Common Brick Manufacturers Association of America, 1309 Schofield Bldg., Cleveland, Ohio.
Brick for the Average Man's Home. Book. 8½ x 11 in. 72 pp. Color plates. Book of plans for bungalows, houses and apartments for which working drawings are available. Price \$1.00.
Brick—How to Build and Estimate. Book. 8½ x 11 in. 48 pp. Illustrated. A manual for the brick builder on estimating and details of brick construction. Price 25c.

BUILDING STONE—See Stone Building

CEMENT

American Materials Company, 101 Park Avenue, New York; Weed Street and Sheffield Avenue, Chicago, Ill.
Elastica, the Stucco of Permanent Beauty. Catalog. 8½ x 11 in. 32 pp. Illustrated. Treatise on composition and application of Elastica Stucco.

Carney's Cement Company, Mankato, Minn. Booklet. 8 x 10 in. 20 pp. Illustrated. Complete information on product, showing prominent buildings in which this cement has been used.

Muller, Franklyn R. Co., Waukegan, Ill.
Elastica Magnesite Stucco. Booklet. 8½ x 11 in.

Sandusky Cement Co., Dept. F, Cleveland, Ohio.
Medusa White Portland Cement, Stainless. Booklet. 8½ x 11 in. 48 pp. Illustrated.
Medusa Waterproof White Portland Cement. Booklet. 6 x 9 in. 32 pp. Illustrated.
Medusa Review. 6 x 9 in. 18 pp. Illustrated. House organ issued bi-monthly.

United States Materials Co., Weed Street and Sheffield Avenue, Chicago, Ill. See American Materials Co.

CONDUIT

National Metal Molding Co., 1113 Fulton Building, Pittsburgh, Pa.
Bulletin of all National Metal Molding Products. In correspondence folder. 9½ x 11½ in.
Sherarduct. Circular. 5 x 8 in. Illustrated.
Flexsteel. Circular. 5 x 8 in. Illustrated.

CONSTRUCTION, FIREPROOF

Bostwick Steel Lath Co., The, Niles, Ohio.
After the Fire. Booklet. 6 x 9 in. 13 pp. Illustrated. Showing the fire-resistance of Bostwick "Truss-Loop."

General Fireproofing Co., The, Youngstown, Ohio.
Fireproofing Handbook. Catalog. 6 x 9 in. 112 pp. A book dealing with the problems of fireproof construction, using as a basis the reinforcing materials—Self-Sentering, Trusset and Expanded Metal.

General Fireproofing. 8½ x 11 in. 16 pp. House organ issued monthly.

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Fire Proofing Bulletin 171. 8½ x 11 in. 32 pp. Illustrated. A treatise on fire proof floor construction.

Northwestern Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.
Fireproof Construction. Catalog. 6 x 9 in. 72 pp. Illustrated. Handbook of practical suggestions for architects and contractors. Describing Nemo Expanded Metal Lath.

Fire-proof Construction. Handbook. 6 x 9 in. 72 pp. Illustrated. Describing Kno-Burn expanded metal lath.

Republic Fireproofing Co., 26 Cortlandt Street, New York.
Republic Fireproofing Construction for Buildings. Booklet. 8½ x 11 in. 28 pp. Illustrated. A complete description on the two-way construction, its lightness, distribution of loads, saving of loads, saving in structural steel or concrete and its general adaptability to Fireproof Construction.

DAMPPROOFING

Truscon Laboratories, The, Caniff Avenue and Grand Trunk R. R., Detroit, Mich.
Truscon Stonetex. Booklet. 5 x 8 in. 36 pp. Illustrated. A booklet telling of methods to decorate and make brick, stucco and masonry free from stains by the application of a cement coating.

DOORS, WINDOWS AND TRIM, METAL

Dahlstrom Metallic Door Company, 425 Buffalo Street, Jamestown, N. Y.

Architectural Catalog. 10 x 14 in. 46 pp. 11 sections. Illustrated. Catalog showing our regular styles and types of hollow metal doors and interior trim. Various types of frames and other architectural shapes also illustrated.

Merchant & Evans Co., 2019 Washington Avenue, Philadelphia, Pa.

Evans "Almet" Fire Doors and Shutters. Catalog. 8½ x 10½ in. 24 pp. Describes the entire line including "Star" Ventilators.

DOORS, WINDOWS AND TRIM, WOOD

Curtis Service Bureau, 6034-7034 S. Second Street, Clinton, Iowa.

Architectural Exterior and Interior Woodwork, Standardized. Catalog. 9 x 11½ in. 238 pp. Illustrated. Covers a complete line of architectural woodwork, standardized both as to designs and sizes. Builders are requested to apply through their dealer.

Reliance Fireproof Door Co., 47 Milton Street, Brooklyn, N. Y.

Reliance Fireproof Doors. Catalog. 6½ x 9½ in. 44 pp. Illustrated. Contains details of door and window construction, including molding and trim dies.

DUMBWAITERS

Kaestner & Hecht Co., Chicago, Ill.

Bulletin 520. Describes K. & H. Co. electric dumbwaiters. 8 pp. Sedgwick Machine Works, 151 West 15th Street, New York.

Catalog and Service Sheets. Standard specifications, plans and prices for various types, etc. 4½ x 8½ in. 60 pp. Illustrated.

ELECTRICAL EQUIPMENT

General Electric Co., Schenectady, N. Y.

G. E. Specialty Catalog. 3½ x 4½ in. 210 pp. Illustrated. Pocket size descriptive booklet with cloth binding. Gives dimensions, catalog numbers, capacities, package weights, etc., of a complete line of essential wiring devices.

Novalux. Booklet. 9 x 10½ in. 36 pp. Illustrated. Ornamental street lighting units.

Standard Unit Switchboard Panels. Booklet. 8 x 10½ in. Illustrated. An index to types of standard unit panels for large and small plants, alternating current and direct current, giving references to descriptive bulletins on each type.

Habirshaw Electric Cable Company, Inc., 10 East 43d Street, New York.

Plans and Specifications for the Home Electrical. Catalog. 11 x 14 in. 20 pp. Rubber, oiled paper, varnished cambric insulated wires and cables for every condition of service.

Prometheus Electric Co., 511 West 42nd Street, New York.

Electrical Equipment. Booklet. 6 x 9 in. 5 pp. Illustrated.

Electric plate warmers, sterilizers and mechanical heating devices.

Simplex Wire & Cable Co., 201 Devonshire Street, Boston, Mass.

Simplex Manual. Catalog and reference book. 6½ x 4½ in. 92 pp. Contains in addition to information regarding Simplex products, tables and data for the ready reference of architects, electrical engineers and contractors.

Western Electric Co., 195 Broadway, New York.

Western Electric Electrical Supply Year Book. Catalog. 6½ x 9½ in. 1248 pp. Illustrated. Listing equipment for every electrical need for homes, institutions, office buildings and industrial plants. Prices for estimating included.

Western Electric Flip Switches. Folders. Illustrated. Listing a complete line of lighting switches operated by levers thrown up or down.

Western Electric Decorations for Duplexalites. Bulletin L-1. 6½ x 9½ in. 8 pp. Illustrated. Listing a great variety of shades and decorations in parchment, silk, etc., for standard Duplexalites.

ELEVATORS

Kaestner & Hecht Co., Chicago, Ill.

Bulletin 500. Contains 32 pp. Giving general information on passenger elevators for high buildings.

Otis Elevator Company, 11th Ave. & 26th Street, New York, N. Y.

Otis Push Button Controlled Elevators. Booklet. 6 x 9 in. 56 pp. Illustrated. Detailed description of Otis Push Button Elevators. Their uses in residences, stores, institutions, apartment houses, business offices and banks, etc.

Otis Gravity Spiral Conveyors. Booklet. 6 x 9 in. 56 pp. Illustrated. Gravity spiral conveyors for lowering packaged merchandise, boxed, cased and bundled goods in factories, warehouses, terminal buildings, etc.

Otis Electric Traction Elevators. Booklet. 9 x 12 in. 28 pp. Illustrated. Full details and illustrations of Otis geared and gearless traction elevators for all types of buildings.

Otis Escalators. Booklet. 6 x 9 in. 36 pp. Illustrated. Description of step and cleat type single and double file escalators (moving stairways).

Sedgwick Machine Works, 151 West 15th Street, New York.

Catalog and descriptive pamphlets. 4½ x 8½ in. 70 pp. Illustrated. Descriptive pamphlets on hand power freight elevators, sidewalk elevators, automobile elevators, etc.

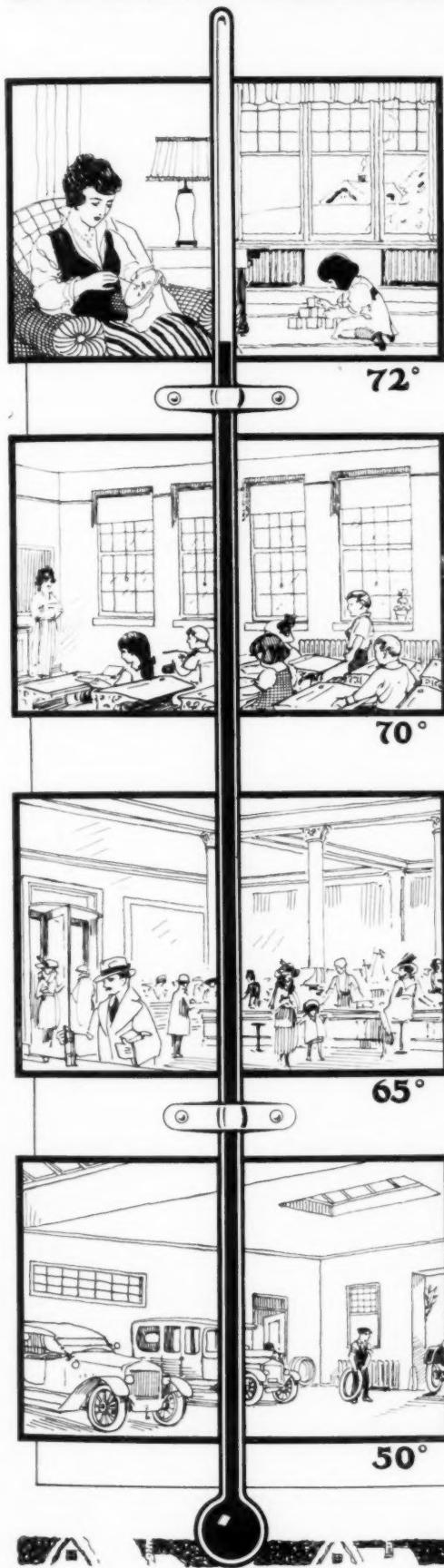
FENCES

American Fence Construction Co., 106 Church Street, New York.

Afco Factory Fences. Booklet. 9 x 12 in. 32 pp. Illustrated.

Residential Fences. Booklets. 7 x 2½ in. Illustrated. A series of booklets on residential fences consisting of photographs, productions and brief descriptions.

STANDARDS of WARMTH



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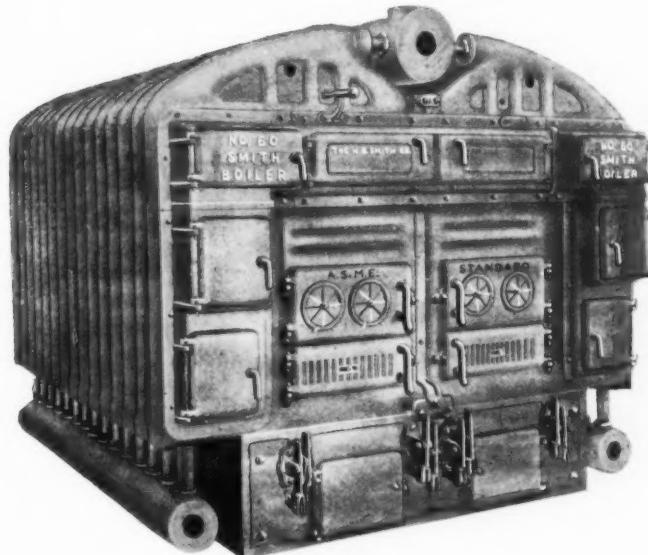
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SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 50***FIRE DOORS—See Doors, Windows and Trim, Metal
FLOORING**

Armstrong Cork Co. (Linoleum Dept.), Lancaster, Pa.
 Armstrong's Linoleum Floors. Catalog. $8\frac{1}{2} \times 11$ in. 54 pp.
 Color plates. A technical treatise on linoleum, including tables and specifications for installing linoleum floors.
 The Artistic Possibilities of Armstrong's Linoleum Floors. Booklet. $11\frac{1}{4} \times 16\frac{1}{2}$ in. 12 pp. Color plates.
 Armstrong's Linoleum Pattern Book, 1920. Catalog. $3\frac{1}{2} \times 6$ in. 176 pp. Color plates. Reproductions in color of all patterns of linoleum and cork carpet in the Armstrong line.
 Quality Sample Book. Three books. $3\frac{1}{2} \times 5\frac{1}{4}$ in. Showing all grades and thicknesses in the Armstrong line of linoleum and cork carpets.

Johns-Manville Co., H. W., New York City.
 A Flooring That's "Made to Fit." Booklet. $3\frac{1}{2} \times 6$ in. 14 pp. Illustrated. Descriptive of Johns-Manville Asphalt Mastic Flooring.

Muller Co., Franklyn R., Waukegan, Ill.
 Asbestos Composition Flooring. Circulars. $8\frac{1}{2} \times 11$ in. Description and Specifications.

Oak Flooring Manufacturers Association, 1014 Ashland Block, Chicago, Ill.
 Modern Oak Floors. Booklet. $6\frac{1}{4} \times 9\frac{1}{4}$ in. 24 pp. Illustrated. A general book that tells the complete story on Oak Flooring.
 Oak Flooring, How and When to Use it. Booklet. $3\frac{1}{2} \times 6\frac{1}{4}$ in. 16 pp. Illustrated. A small, technical book showing the general rules, standard thicknesses and widths, how to lay, finish and care for oak floors.

FLOOR HARDENERS

Anti-Hydro Waterproofing Co., 299 Broadway, New York.
 Floor Hardening. Circular. $6\frac{1}{2} \times 8\frac{1}{2}$ in. 4 pp. Describes an inexpensive method for producing permanently smooth, dustless and wearproof floors.

Sonneborn Sons, Inc., L., 266 Pearl Street, New York.
 Concrete and Lapidolith. Booklet. $5\frac{1}{2} \times 8\frac{1}{2}$ in. 24 pp. Illustrated. Describing relation of Lapidolith chemical floor hardener to concrete construction.
 Why Lapidolite? Booklet. $8\frac{1}{2} \times 11$ in. 11 pp. Illustrated. Reasons why Lapidolith should be specified.
 Lapidolith Specifications. Circular. $8\frac{1}{2} \times 10\frac{1}{2}$ in. 2 pp.

Truscon Laboratories, The, Cor. Caniff Avenue and Grand Trunk R. R., Detroit, Mich.
 Agatex and Its Performances. Booklet. $8\frac{1}{2} \times 11$ in. Describes the methods of hardening concrete floors by the application of a chemical which forms a new surface as hard as agate.

FURNACES—See Heating Equipment**FURNITURE**

Leavens Co., Inc., The William, 32 Canal Street, Boston, Mass.
 Catalog. 7×9 in. 200 loose leafed pp. Illustrated with wood cuts.

GARAGE CONSTRUCTION

Ramp Building Corporation, 50 Church Street, New York, N. Y.
 The d'Humy Motoramp System of Building Design. Booklet. $8\frac{1}{2} \times 11$ in. 20 pp. Illustrated. Describing the d'Humy system of ramp construction for garages, service buildings, factories, warehouses, etc., where it is desirable to drive automobiles and motor trucks or industrial tractors under their own power from floor to floor.

GLASS CONSTRUCTION

Mississippi Wire Glass, 220 Fifth Avenue, New York.
 Mississippi Wire Glass. Catalog. $3\frac{1}{2} \times 8\frac{1}{2}$ in. 32 pp. Illustrated. Covers the complete line.

HARDWARE

Cutler Mail Chute Company, Rochester, N. Y.
 Cutler Mail Chute Model F. Booklet. $4 \times 9\frac{1}{4}$ in. 8 pp. Illustrated.

L. P. T. Specialty Co., 846 Builders Exchange, Minneapolis, Minn.
 Details and Specifications for Counter Balanced Window Hardware. $8\frac{1}{2} \times 11$ in. Illustrated with drawings and blue prints.

McKinney Mfg. Co., Pittsburgh, Pa.
 McKinney Cabinet Hardware. Catalog. 6×9 in. 32 pp. Illustrated. Describes complete line of hardware for cabinet and furniture work.
 McKinney Hardware for Sliding Doors. Booklet. 6×9 in. 18 pp. Illustrated. Describes different types of sliding door hardware.

Smith & Egge Mfg. Co., The, Bridgeport, Conn.
 Catalog No. 10. $6\frac{1}{4} \times 9$ in. 42 pp. Illustrated. Covers a complete line of chains, hardware and specialties.

Stanley Works, The, New Britain, Conn.
 Wrought Hardware. Catalog. BJ10. $6\frac{1}{4} \times 10$ in. Color plates. Shows all of the Stanley Works products made of steel from their own mills.
 Eight Garages and their Stanley Garage Hardware. Booklet. $5 \times 6\frac{1}{4}$ in. 32 pp. Illustrated. Illustrations and floor plans of eight typical garages that have been correctly equipped with Stanley Garage Hardware.
 Ball Bearing Butts. Booklet. B8. $5 \times 7\frac{1}{2}$ in. 32 pp. Illustrated. Concise description of various butts manufactured.
 Stanley Specially Designed Garage Hardware. Booklet. B-50. 6×9 in. 24 pp. Illustrated. Detailed pictures and descriptions of various garage hardware equipment.

Vonnegut Hardware Co., Indianapolis, Ind.
 Von Duplicin Self-Releasing Fire Exit Devices. Catalog 12F. 8×11 in. 41 pp. Illustrated.
 "Saving Lives." Booklet. $3\frac{1}{2} \times 6$ in. 16 pp. Illustrated. A brief outline why Self-Releasing Fire Exit Devices should be used.

HEATING EQUIPMENT

James B. Clow & Sons, 534 S. Franklin Street, Chicago, Ill.
 Gasteam Catalog. 6×9 in. 16 pp. Illustrated. New radiator using gas for fuel.

Abram Cox, American & Dauphin Streets, Philadelphia, Pa.
 Catalog 73. 9×12 in. 40 pp. Illustrated. Covers the complete line.

Industrial Housing Circular. $8 \times 10\frac{1}{2}$ in. 12 pp. Illustrated. Modern industrial housing projects with specifications for heating equipment.

Smokeless Boiler Circular. $8 \times 10\frac{1}{2}$ in. 8 pp. Detailed description of the Novelty Smokeless Boiler—The boiler with the carburetor.

Gorton & Lidgerwood Co., 96 Liberty Street, New York.
 Gorton Self-Feeding Boilers. Booklet. $4\frac{1}{4} \times 7\frac{1}{4}$ in. 32 pp. Illustrated. Descriptions, specifications and prices.

Graver Corporation, East Chicago, Ind.
 Hot Water Service Heaters. Booklet. $8\frac{1}{2} \times 11$ in. 4 pp. Illustrated. Describing Graver vertical and horizontal service heaters which utilize exhaust steam for heating.

Kelly Controller Co., 175 W. Jackson Blvd., Chicago, Ill.
 The Kelly Low Pressure Controller. Booklet. 4×9 in. 22 pp. Illustrated. Describing what The Kelly Controller accomplishes, its mechanical operation, and its application.

Kewanee Boiler Co., Kewanee, Ill.
 Kewanee on the Job. Catalog. $8\frac{1}{2} \times 11$ in. 80 pp. Illustrated. Showing installations of Kewanee boilers, water heaters, radiators, etc.

Catalog No. 73. 6×9 in. 35 pp. Illustrated. Describes Kewanee steel power boilers with complete specifications.

Catalog No. 74. 6×9 in. 35 pp. Illustrated. Describes Kewanee steel heating boilers with specifications.

Catalog No. 75. $8\frac{1}{2} \times 11$ in. 6 pp. Illustrated. Specifications on Tabasco Water Heaters, Kewanee water heating garbage burners and Kewanee steel tanks.

Page Boiler Co., The Wm. H., 141 West 36th Street, New York.
 Page Boilers. Catalog. $4\frac{1}{4} \times 8\frac{1}{2}$ in. 84 pp. Illustrated. Descriptions, specifications and methods of installing Page Round and Square Sectional Boilers.

Monarch Smokeless Boilers. Circular. $8\frac{1}{2} \times 11$ in. Illustrated. Describing the Monarch Down-draft Smokeless Boilers.

Riverside Boiler Works, Cambridge, Mass.
 Riverside Range Boilers and Tanks. Catalog. 6×3 in. 35 pp. Illustrated. Shows sizes regularly manufactured, methods of installation and descriptions of processes used in manufacturing.

Smith Co., H. B., 57 Main Street, Westfield, Mass.
 General Boiler and Radiator Catalog. 4×7 in. 90 pp. Illustrated. Giving ratings, dimensions, capacities and working pressures.

Engineer's Data Ring Book. 4×7 in. 125 pp. Illustrated.

Architect's and Contractor's Binders. These binders are made up of $9\frac{1}{2} \times 11$ in. folders of different kinds giving dimensions, price lists, and erecting directions on the different lines of our manufacture.

United States Radiator Corporation, Detroit, Mich.
 The Complete Line. Catalog. $4\frac{1}{4} \times 7\frac{1}{4}$ in. 255 pp. Illustrated. Contains important technical information of special interest to architects and heating engineers.

A Day's Work. Booklet. $3\frac{1}{2} \times 6$ in. 20 pp. Suggestions from employees for the purpose of promoting service and good will.

Utica Heating Co., Utica, N. Y.
 Imperial Boilers & Heating Supplies. Catalog. $3\frac{1}{2} \times 6\frac{1}{2}$ in. 52 pp. Illustrated.

Imperial Super Smokeless Boilers. Loose leaf catalog. $8\frac{1}{2} \times 11$ in. 24 pp.

Superior Warm Air Furnaces. Catalog. $4\frac{1}{4} \times 8$ in. 36 pp. Illustrated.

New Idea Pipeless Furnaces. Circular. $8\frac{1}{2} \times 11$ in. 4 pp. Illustrated.

HOISTS

Gillis & Geoghegan, 544 West Broadway, New York.
 Hoists for Industrial Plants. Booklet. $6 \times 8\frac{1}{2}$ in. 8 pp. Illustrated. Labor saving service in the lifting or lowering of lighter loads, through the use of G. & G. Telescopic and Non-telescopic Hoists.

Removing Ashes. Booklet. $6 \times 8\frac{1}{2}$ in. 6 pp. Illustrated. Removing ashes from boiler room directly to wagon by electrically operated Telescopic Hoists.

HOLLOW TILE—See Tile, Hollow**INSULATION**

Armstrong Cork Co., 132 Twenty-fourth Street, Pittsburgh, Pa.
 Nonpareil Corkboard Insulation. Catalog. 6×9 in. 152 pp. Illustrated. Describes use in cold storage warehouses and wherever constant low temperatures are necessary.

Nonpareil Cork Covering. Catalog. 6×9 in. 64 pp. Illustrated. Describes the insulation of cold pipes and tanks of all kinds.

Philip Carey Co., The, Cincinnati, Ohio.
 Carey Asbestos and Magnesia Products. Catalog. 6×9 in. 72 pp. Illustrated.

JOISTS AND STUDS, PRESSED STEEL

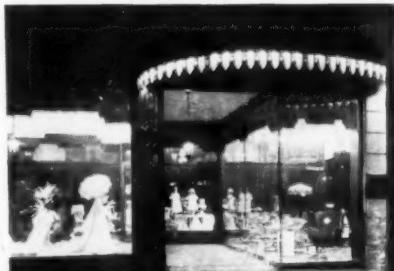
General Fireproofing Co., Youngstown, Ohio.
 Steel Lumber. Hand Book. $4 \times 6\frac{1}{2}$ in. 72 pp. Illustrated. Data on the use of Steel Lumber and Metal Lath for economical fireproof construction. Tables and Specifications.

Truscon Steel Co., Youngstown, Ohio.
 Truscon Standard Buildings, 4th ed. Catalog. $8\frac{1}{2} \times 11$ in. 40 pp. Illustrated. Erection details, cross-section diagrams and adaptions are given.

Truscon Structural Pressed Steel. Catalog. $8\frac{1}{2} \times 11$ in. 24 pp. Illustrated. Information on Pressed Steel Beams and Joists for light occupancy buildings. Tables, specifications and views of installations.

Specify Holophane Products

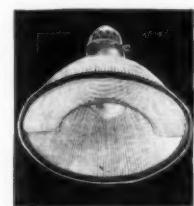
Scientific lighting for stores, offices, schools, homes and industrial plants



Holophane Installation Reflector Type No. 983



Holophane Installation Reflector Type No. 983



Holophane Reflector
Type No. 922



Holophane Reflector
Type No. 983

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THE beauty and effectiveness of a store window may be greatly enhanced or crudely marred by the lighting arrangements.

More and more, architects are finding that the simplest and most satisfactory solution of this problem is to specify Holophane Window Lighting Reflectors.

They give a clear flood of soft, even illumination, free from any glare. They make the lighted window inviting, attractive—a positive selling force. They are low in first cost and most efficient in operation.

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HOLOPHANE COMPANY, INC.
340 Madison Ave., Dept. L-21 New York City

Works: Newark, Ohio

HOLOPHANE

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS — *Continued from page 52***KITCHEN EQUIPMENT**

Aluminum Cooking Utensils Co., New Kensington, Pa.
Wear-Ever. Catalog. 6 x 9 in. 55 pp. Illustrated.

LATH, METAL AND REINFORCING

The Bostwick Steel Lath Co., Niles, Ohio.

Bostwick Steel Lath, Revised Edition 1920. Catalog. 9 x 11 1/2 in. 28 pp. Illustrated. Covers the entire line. Drawings and Specifications.

General Fireproofing Co., Youngstown, Ohio.

Herringbone Rigid Metal Lath. Catalog. 8 1/2 x 11 in. 32 pp. Illustrated. A treatise on the many uses of Metal Lath.

Truslat. Booklet. 6 x 9 in. 16 pp. Illustrated. Detailed descriptions on the use of Truslat as a reinforcement for Concrete.

Self-Sentering—A Reinforcement for Concrete Floors, Roofs and Walls. Booklet. 8 1/2 x 11 in. 36 pp. Illustrated.

North Western Expanded Metal Co., 934 Old Colony Building, Chicago, Ill.

Designing Data. Catalog. 6 x 9 in. 94 pp. Illustrated. Describes most efficient use of Econo Expanded Metal Reinforcing.

Formless Concrete Construction. Catalog. 6 x 9 in. 80 pp. Illustrated. Describes use of T-Rib Chancelot, a form and reinforcing for concrete.

Truscon Steel Co., Youngstown, Ohio.

High Rib and Metal Lath. 18th ed. Catalog. 8 1/2 x 11 in. 64 pp. Illustrated. Gives properties of laths, specifications, special uses and views of installations.

LUMBER

American Walnut Mfrs. Assoc., Rm. 1000, 616 S. Michigan Blvd., Chicago, Ill.

American Walnut, the Choice of the Master Craftsman. Booklet. 7 x 9 in. 45 pp. Illustrated. The use of walnut in fine furniture and woodwork.

Specification Notes for American Walnut Interior Trim. 8 1/2 x 11 in. 3 pp. Includes notes on the different styles of finish suitable for walnut.

California Redwood Association, 760 Exposition Building, San Francisco, Calif.

California Redwood Homes. Booklet. 6 x 9 in. 16 pp. Illustrated.

Specialty Uses of California Redwood. Booklet. 6 x 9 in. 24 pp. Illustrated.

California Redwood on the Farm. Booklet. 3 1/2 x 9 1/4 in. 40 pp. Illustrated.

How to Finish California Redwood. Booklet. 3 1/2 x 9 1/4 in. 16 pp. Illustrated. Formulae and instructions.

Long Bell Lumber Co., R. A. Long Building, Kansas City, Mo.

The Post Everlasting. Booklet. 10 1/2 x 7 1/2 in. 32 pp. Illustrated. Information regarding creosoted yellow pine fence posts, barn poles, paving blocks, etc.

Poles That Resist Decay. Booklet. 9 1/2 x 4 in. 16 pp. Illustrated. Poles for telegraph, telephone, high power transmission lines.

METAL LATH—See Lath, Metal and Reinforcing**METALS**

American Sheet & Tin Plate Co., Frick Building, Pittsburgh, Pa. Reference Book. Pocket Ed. 2 1/2 x 4 1/2 in. 168 pp. Illustrated. Covers the complete line of Sheet and Tin Mill Products.

Copper—Its Effect Upon Steel for Roofing Tin. Catalog. 8 1/2 x 11 in. 28 pp. Illustrated. Describes the merits of high grade roofing tin plates and the advantages of the copper-steel alloy.

Apollo and Apollo Keystone Galvanized Sheets. Catalog. 8 1/2 x 11 in. 20 pp. Illustrated.

Research on the Corrosion Resistance of Copper Steel. Booklet. 8 1/2 x 11 in. 24 pp. Illustrated. Technical information on results of atmospheric corrosion tests of various sheets under actual weather conditions.

facts Simply and Briefly Told. Booklet. 8 1/2 x 11 in. 16 pp. Illustrated. Non-technical statements relating to Keystone Copper Steel.

Black Sheets and Special Sheets. Catalog. 8 1/2 x 11 in. 28 pp. Illustrated. Describes standard grades of Black and Uncoated Sheets, together with weights, bundling tables, etc.

Bright Tin Plates. Catalog. 8 1/2 x 11 in. 16 pp.

International Nickel Company, 43 Exchange Place, New York, N. Y. Pamphlet. 3 1/2 x 6 in. 8 pp. Illustrated. Describing the wire strength and durability of Monel Screens.

METAL TRIM—See Doors, Windows and Trim, Metal**MORTAR COLORS**

Clinton Metallic Paint Co., Clinton, N. Y. Clinton Mortar Colors. Booklet. 3 1/2 x 6 1/2 in. 8 pp. Illustrated. Complete description of Clinton Mortar Colors with color samples.

NURSERIES

King Construction Company, N. Tonawanda, N. Y. Catalog No. 52. 9 x 11 in. 45 pp. Illustrated. Illustrating and describing greenhouses erected for private estates and public parks.

OFFICE SUPPLIES

Angel, Inc., H. Reeve, 7-11 Spruce St., New York. Drawing Papers. Sample Book. 3 1/2 x 5 1/2 in. Showing all the surfaces and substances in general demand.

Dixon Crucible Co., Joseph, Pencil Dept., 224 J. Jersey City, N. J. Finding Your Pencil. Booklet. 6 1/2 x 3 1/2 in. 16 pp. Illustrated.

The First Five. Booklet. 3 1/2 x 5 1/2 in. 10 pp. Illustrated.

A Study in Sepia. Booklet. 7 x 4 1/2 in. 5 pp. Illustrated.

Faber Co., Eberhard, 37 Greenpoint Avenue, Brooklyn, N. Y. Eberhard Faber Pencils, How They Are Made. Booklet. 4 1/2 x 6 1/2 in. 23 pp. Illustrated.

N. Y. Blueprint Paper Co., 102 Reade St., New York. Catalog of Drawing Materials, Mathematical and Engineering Instruments. 4 x 6 in. 400 pp. Illustrated. Covers the complete line.

PAINTS, STAINS, VARNISHES AND WOOD FINISHES

Berry Brothers, Detroit, Michigan.

"Natural Woods and How to Finish Them." Booklet. 6 1/2 x 4 1/2 in. 95 pp. Containing technical information and advice concerning wood finishing.

"Beautiful Homes." Booklet. 8 1/2 x 6 1/2 in. 26 pp. Illustrated in colors. Giving information to home builders and others on interior finishing.

Cabot, Inc., Samuel, Boston, Mass.

Cabot's Creosote Stains. Booklet. 4 x 8 1/2 in. 16 pp. Illustrated.

Cres-Dip Company, Inc., 1025 Oliver St., Tonawanda, N. Y.

Dixie White. Folder. 3 1/2 x 8 in. 3 pp. Illustrated. A heavy white stain which produces the whitewashed effect.

Devoe & Reynolds Co., Inc., 101 Fulton Street, New York.

Architectural Finishes. Catalog. 5 x 7 in. 40 pp. Specifications and suggestions for painting, varnishing, staining and enameling.

Harmony in the Home. Booklet. 4 1/2 x 6 in. 24 pp. Illustrated.

Flat finish wall paints, color suggestions and specifications.

Eagle-Picher Lead Co., The, 208 S. La Salle Street, Chicago, Ill.

Protective Coatings for Structural Metals. Book. 6 x 9 in. 48 pp. Illustrated.

Fox Co., M. Ewing, New York, N. Y.

Calcimines. Booklet. 3 1/2 x 6 1/2 in. 8 pp. Color cards.

O'Brien Varnish Co., 1121 Washington Avenue, South Bend, Ind.

That Magic Thing Called Color. Booklet. 5 1/2 x 8 1/2 in. 24 pp. Illustrated. Short treatise on the use of color in the home, special reference to walls and ceilings.

Architects' Specification Manual. 8 1/2 x 11 in. 50 pp. Complete specifications for all paint products.

The Sherwin-Williams Co., 882 Canal Road, Cleveland, Ohio.

A Book of Painting and Varnishing Specifications. 8 1/2 x 11 in. 30 pp. A text book on painting and finishing.

Announcement of Sherwin-Williams Flat-Tone Multi-Color Effects.

Booklet. 2 1/2 x 6 in. 10 pp. Illustrated. Development of a new system of wall decoration.

Monthly Architectural Bulletin. 8 1/2 x 11 in. Bulletin issued periodically on painting and finishing.

Smith & Co., Edward, P. O. Box 76, City Hall Station, New York, N. Y.

Architect's Hand Book. 4 1/2 x 7 1/2 in. 24 pp. Specifications and suggestions for painting, varnishing, enameling, etc.

Sonneborn Sons, Inc., L., Dept. 4, 264 Pearl Street, New York.

Paint Specifications. Booklet. 8 1/2 x 10 1/2 in. 4 pp.

Truscon Laboratories, The, Cor. Caniff Avenue and Grand Trunk R. R., Detroit, Mich.

Spread the Sunshine Inside. Booklet. 5 x 8 in. 24 pp. Describes methods for light saving by the application of light reflecting enamel to interior walls of factories and workrooms.

Wadsworth-Howland Co., Inc., Boston, Mass.

Paints and Varnishes. Catalog. 5 1/2 x 8 1/2 in. 140 pp. Illustrated. Covers the complete line.

PIPE

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill. Catalog "A." 4 x 6 1/2 in. 706 pp. Illustrated. Shows a full line of steam, gas and water works supplies.

National Tube Co., Frick Building, Pittsburgh, Pa.

National Bulletin No. 11. History, Characteristics and Advantages of National Pipe. Catalog. 8 1/2 x 11 in. 48 pp. Illustrated.

National Bulletin No. 25. National Pipe in Large Buildings. Catalog. 8 1/2 x 11 in. 88 pp. Illustrated.

National Bulletin No. 7. Manufacture and Advantages of National Welding Scale Free Pipe. Booklet. 8 1/2 x 11 in. 16 pp. Illustrated.

National Bulletin No. 3. Prevention of Corrosion in Pipe. Booklet. 8 1/2 x 11 in. 24 pp. Illustrated. Contains the results of carefully conducted investigations.

PLUMBING EQUIPMENT

Brunswick-Balke-Collender Co., 623 S. Wabash Avenue, Chicago, Ill.

Whale-bone-ite Seat. Booklet. 3 1/2 x 6 1/2 in. 4 pp. Illustrated.

Whale-bone-ite Seat. Booklet. 3 1/2 x 6 1/2 in. 8 pp. Illustrated.

Clow & Sons, James B., 534 S. Franklin Street, Chicago, Ill.

Catalog "M." 9 1/2 x 12 in. 184 pp. Illustrated. Shows complete line of plumbing fixtures for Schools, Railroads and Industrial Plants.

Crane Company, 836 S. Michigan Avenue, Chicago, Ill.

Crane Products in World Wide Use. Catalog. 5 x 9 1/2 in. 24 pp. Illustrated.

Plumbing Suggestions for Home Builders. Catalog. 3 x 6 in. 90 pp. Illustrated.

Plumbing Suggestions for Industrial Plants. Catalog. 4 x 6 1/2 in. 43 pp. Illustrated.

No. 50 Steam Pocket Catalog. 4 x 6 1/2 in. 775 pp. Illustrated.

Describes the complete line of the Crane Co.

Eagle-Picher Lead Co., The, 208 S. La Salle Street, Chicago, Ill.

Plumbers' Lead Guide. Catalog. 4 1/2 x 7 1/2 in. 52 pp. Illustrated.

Maddock's Sons Co., Thomas, Trenton, N. J.

Highest Grade Standardized Plumbing Fixtures for Every Need.

Catalog. 5 x 7 1/2 in. 94 pp. Illustrated. Covers the complete line.

Bathroom Individuality. Booklet. 6 x 9 in. 28 pp. Illustrated.

Showing view of complete bathrooms with complete descriptions of floor plans.

Specifications for plumbing fixtures. Booklet. 9 x 12 in. 8 pp.

Tables of specifications for industrial buildings, schools, apartments, hotels, etc.

Rundle-Spence Mfg. Co., Milwaukee, Wis.

Bubbling Fountains. Catalog. 5 1/2 x 8 in. 74 pp. Illustrated.

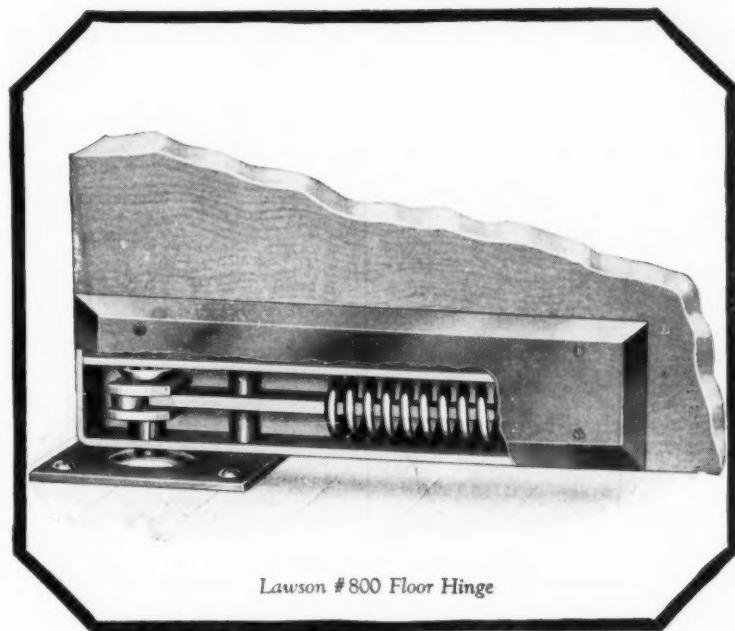
PUMPS

Goulds Mfg. Co., The, Seneca Falls, N. Y.

Set of Twenty Bulletins. 7 1/2 x 10 1/2 in. 12 to 32 pp. each. Illustrated.

Covers complete line of power and centrifugal pumps for all services.

Catalog "K." 6 x 9 in. 216 pp. Illustrated. Covers complete line of smaller size pumps.



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60,000 Double Swings Without a Sign of Wear



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So a Lawson Hinge, taken from a dealer's stock, was put to a thorough test. Fitted to a 50-lb. door, it was slammed back and forth continuously—60,000 complete double swings. After this treatment, as severe as the average hinge would get in a life-time, no part of

the hinge showed any appreciable sign of wear. It continued to swing smoothly with no lost motion at dead center. This is the result of Lawson scientific construction. Strength where strength is needed. Friction eliminated where the wear comes.

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Seattle San Francisco
Los Angeles

LAWSON

SELECTED LIST OF MANUFACTURERS' PUBLICATIONS—Continued from page 54

REFRIGERATION

Johns-Manville Co., The H. W., Madison Avenue and 41st Street, New York, N. Y.
Johns-Manville System of Refrigeration. Booklet. $3\frac{1}{4} \times 6$ in. 16 pp. Illustrated.

ROOFING

Philip Carey Co., The, Cincinnati, Ohio.
Architects' Specifications for Carey Building Material. $8\frac{1}{2} \times 11$ in. 48 pp. Illustrated.

Johns-Manville Co., The H. W., Madison Avenue and 41st Street, New York.
Johns-Manville Asbestos Shingles. Booklet. $3\frac{1}{4} \times 6$ in. 32 pp. Illustrated. Prices, construction data and specifications.
Johns-Manville Roofing and Building Materials. Catalog. $3\frac{1}{4} \times 6$ in. 24 pp. Illustrated. Describes building materials such as asbestos wood, sound deadening and insulating felts, waterproofing, etc.

Kearney & Mattison Co., Ambler, Pa.
Ambler Asbestos Shingles. Catalog. $5\frac{1}{2} \times 8\frac{1}{2}$ in. 40 pp. Illustrated.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. $8\frac{1}{2} \times 11$ in. 36 pp. Illustrated. Standard Purlin Spacing Tables.
Ambler Asbestos Corrugated Roofing and Siding. Catalog. $8\frac{1}{2} \times 11$ in. 20 pp. Illustrated. Prices and specifications.
Ambler Asbestos Building Lumber. Catalog. $8\frac{1}{2} \times 11$ in. 32 pp. Illustrated.

SEWAGE DISPOSAL

Kewanee Private Utilities, 442 Franklin St., Kewanee, Ill.
Specification Sheets. $7\frac{1}{2} \times 10\frac{1}{4}$ in. 46 pp. Illustrated. Detailed drawings and specifications covering water supply and sewage disposal systems.

SHRUBS, TREES, ETC.—See Nurseries

STONE, BUILDING

Harrison Granite Company, 200 Fifth Avenue, New York, N. Y.
Harrison Granite Company, Clientele. $3\frac{1}{4} \times 8\frac{1}{4}$ in. 24 pp. Illustrated. A partial list of clients with illustrations of examples of monuments and mausoleums.

Indiana Limestone Quarrymen's Association, Box 766, Bedford, Indiana.
Vol. 1. Indiana Limestone Library. 6×9 in. 36 pp. Illustrated. Giving general information regarding Indiana Limestone, its physical characteristics, etc.

Vol. 4. Indiana Limestone Bank Book. 6×9 in. 48 pp. Illustrated. Descriptive of the use of Indiana Limestone for bank buildings, containing partial list of buildings in which it has been used.

Vol. 27. Designs for Houses of Indiana Limestone. $8\frac{1}{2} \times 11$ in. 32 pp. Illustrated. Being the best designs submitted in competition for a detached residence faced with Indiana Limestone conducted by *The Architectural Review*.

National Building Granite Quarries Association, Inc. 31 State Street, Boston, Mass.
Booklet. $8\frac{1}{2} \times 11$ in. 16 pp. Illustrated. Contains nineteen color plates of standard American Building Granites; specifications; classification listing colors, textures, and producers; detail sheets illustrating relative value of mouldings, economical design and typical construction; a general description of granite including uses, finishes, tests, etc.

STORE FRONTS

Kawneer Co., The, Niles, Mich.
Kawneer Solid Copper Store Fronts. Catalog "K." $8\frac{1}{2} \times 11$ in. 32 pp. Illustrated. Information about various members used in the pioneer Kawneer construction.
A Collection of Successful Designs. Catalog. $9\frac{1}{4} \times 6\frac{1}{2}$ in. 64 pp. Illustrated. Showing by use of drawings and photographs many types of Kawneer Solid Copper Store Fronts.

Zouri Drawn Metal Co., B. J. 10, Chicago Heights, Ill.
Key to Getting the People In. Catalog BJ8. 6×9 in. 68 pp. Illustrated. Zouri Safety Sash, corner and division bars have been approved by the Underwriter's Laboratories and are manufactured under their supervision.

STUCCO—See Cement, Portland.

STUCCO AND WALL BOARD

Bishopic Manufacturing Co., 103 East Avenue, Cincinnati, Ohio.
Homes Built on the Wisdom of Ages. Catalog. 6×9 in. 48 pp. Illustrated. Describing the use of Bishopic stucco board and Bishopic sheathing board.

Carey Co., The Philip, Cincinnati, Ohio.
Carey Board for Better Building. Catalog. 6×9 in. 32 pp. Illustrated.

TELEPHONE, INTER-COMMUNICATING

Western Electric Co., 195 Broadway, New York.
Specification for W. E. Inter-phones and Private Telephone Systems. $8 \times 10\frac{1}{4}$ in. 88 pp. Illustrated.

TERRA COTTA

Northwestern Terra Cotta Co., The, 2525 Clybourn Ave., Chicago, Ill.
Booklet. $8\frac{1}{4} \times 11$ in. 77 pp. Illustrated. Showing in a concise way the usefulness of terra cotta.

TILE, FLOOR AND WALL

Associated Tile Manufacturers, The, Beaver Falls, Pa.
Tile Floors and Walls for Hospitals. Booklet. $8\frac{1}{2} \times 11$ in. 40 pp. Illustrated. Reasons for selecting Tile for hospitals.
Bring the Crowds to Your Market. Booklet. $8\frac{1}{2} \times 11$ in. 16 pp. Illustrated. The use of Tile for the modern sanitary market.
Preparation for Tile. Booklet. 6×9 in. 32 pp. Illustrated. Describing the manner in which Tile is set and the various types of construction which are used as a foundation for the product.
Swimming Pools. Booklet. $8\frac{1}{2} \times 11$ in. 32 pp. Illustrated. A handbook on swimming pools and their construction.

TILE, HOLLOW

Hollow Building Tile Association, Dept. 1812, Conway Bldg., Chicago, Ill.
Handbook of Hollow Building Tile Construction. $8\frac{1}{4} \times 11$ in. 104 pp. Illustrated. Complete treatise on most approved methods of hollow tile building construction and fireproofing.

National Fire Proofing Co., 250 Federal St., Pittsburgh, Pa.
Standard Wall Construction Bulletin 174. $8\frac{1}{4} \times 11$ in. 32 pp. Illustrated. A complete treatise on the subject of hollow tile wall construction.

Industrial Housing Bulletin 172, $8\frac{1}{4} \times 11$ in. 14 pp. Illustrated. Photographs and floor plans of typical workingmen's homes.

Natoe on the Farm. $8\frac{1}{4} \times 11$ in. 38 pp. Illustrated. A treatise on the subject of fire safe and permanent farm building construction.

VALVES

Jenkins Bros., 80 White Street, New York.
The Valve Behind a Good Heating System. Booklet. $4\frac{1}{2} \times 7\frac{1}{2}$ in. 16 pp. Color plates.

Jenkins Valves for Plumbing Service. Booklet. $4\frac{1}{2} \times 7\frac{1}{2}$ in. 16 pp. Illustrated.

VENTILATION

Globe Ventilator Co., Dept. P., Troy, N. Y.
Globe Ventilator's Catalog. 6×9 in. 32 pp. Illustrated.

Royal Ventilator Co., 415 Locust Street, Philadelphia, Pa.
Ventilation. Catalog. $4\frac{1}{2} \times 9$ in. 48 pp. Illustrated.

WATERPROOFING

Anti-Hydro Waterproofing Co., 299 Broadway, N. Y.
Waterproofing. Booklet. $3\frac{1}{4} \times 6$ in. 4 pp. Methods used for waterproofing concrete and mortars.

General Fireproofing Company, Youngstown, Ohio.
The Waterproofer Handbook. 6×9 in. 98 pp. Illustrated. A Guide to the correct use of GF Waterproofering in addition to describing the complete line of materials.

Minwax Company, Inc., 18 East 41st Street, New York, N. Y.
Waterproofing Exposed Walls. Bulletin No. 22. $8\frac{1}{4} \times 10$ in. 12 pp. Illustrated. Descriptions and specifications dealing with two methods of dampproofing above grade walls, viz., Minwax clear waterproofing or Minwax brick and cement coating, and Minwax asphaltic dampproofing No. 300.

Product Bulletin. $8\frac{1}{2} \times 5\frac{1}{2}$ in. 24 pp. Illustrated with drawings. Condensed catalog of Minwax products for standardized structural protection.

Sandusky Cement Co., Dept. F, Cleveland, Ohio.
Medusa Waterproofing. Booklet. $6\frac{1}{2} \times 9$ in. 37 pp. Illustrated.

Toch Brothers, 320 Fifth Ave., New York, N. Y.
Toxement. Booklet. $5\frac{1}{4} \times 8\frac{1}{2}$ in. Illustrated. 24 pp. Describes Toxement, an integral waterproofing compound for concrete, stucco, cement, mortar, etc.

Truscon Laboratories, The, Cor. Caniff Avenue and Grand Trunk R. R., Detroit, Mich.
Structural Waterproofing. Handbook. $8\frac{1}{2} \times 11$ in. 100 pp. Illustrated. A reliable and trustworthy text-book on modern waterproofing practice.

WATER SOFTENERS

Graver Corp., East Chicago, Ind.
Graver Zeolite Softeners. Bulletin 509. $8\frac{1}{2} \times 11$ in. 16 pp. Illustrated. Water softeners for homes, institutions, hotels, apartments, etc.

Graver Small Continuous Water Softener. Bulletin 507. $8\frac{1}{2} \times 11$ in. 12 pp. Illustrated. A softener for raw water ice plants and small steam power plants.

Permutit Company, The, 440 Fourth Ave., New York, N. Y.
Permutit-Water softened to No (Zero) Hardness. Booklet. $8\frac{1}{2} \times 11$ in. 32 pp. Describing the original Zeolite process of softening water to zero hardness. An essential for homes, hotels, apartment houses, swimming pools, laundries, textile mills, paper mills, ice plants, etc., in hard water districts.

WATER SYSTEMS

Graver Corporation, East Chicago, Ind.
Graver Vertical Pressure Water Feeders. Bulletin 502. $8\frac{1}{2} \times 11$ in. 8 pp. Illustrated. Detailed description of parts, capacities and dimensions.

WINDOW CORD

Samson Cordage Works, Boston, Mass.
Catalog. $3\frac{1}{2} \times 6\frac{1}{4}$ in. 24 pp. Illustrated. Covers complete line.

WINDOWS, CASEMENT

Crittall Casement Window Co., 685 East Atwater Street, Detroit, Mich.
Catalog No. 18. 9×12 in. 56 pp. Illustrated.

Hoffman Mfg. Co., Andrew, 900 Steger Building, Chicago, Ill.
Hoffman Casements. Catalog. $5\frac{1}{4} \times 8$ in. 8 pp. Illustrated. Miniature details and phantom drawings.

F. S. Details. 22×34 in. Full size working details for mill work and installation with isometric views.

Architects' Portfolio. $8\frac{1}{2} \times 11$ in. Loose leaf circulars.
Hope & Sons, Henry, 103 Park Avenue, New York.
Catalog. $12\frac{1}{2} \times 18\frac{1}{2}$ in. 30 pp. Illustrated. Full size details of outward and inward opening casements.

International Casement Co., Inc., Jamestown, N. Y.
Casements for Banks and Public Buildings. Catalog. $8\frac{1}{2} \times 11$ in. 24 pp. Illustrated. Shows construction of steel windows and surrounding masonry.

WOOD—See Lumber



SARGENT
HARDWARE

HOTEL CLEVELAND GRAHAM, ANDERSON, PROBST & WHITE
CLEVELAND, OHIO Architects

THE hardware requirements of a modern hotel combine, to a considerable degree, those of a residence—in which excellence of design and mechanical perfection are prime requisites—with others which, for example, might be demanded by an architect who was specifying the hardware for an office building of the highest type. That there are to be found, within the wide range of styles and types of **SARGENT** locks and hardware, designs peculiarly appropriate and locks with the special functions required for hotel use is evidenced by the number of hotels throughout the country that are **SARGENT** equipped.

SARGENT & COMPANY, Manufacturers
NEW HAVEN, CONN.

NEW YORK

CHICAGO

Sargent Hardware is sold by representative dealers in all principal cities

Unnoticed Service



THE architect in his work on the plan and perspective drawings does much which the layman neither sees nor appreciates. These little added touches mark true craftsmanship. Were they omitted architectural development would suffer. Unnoticed service is often the most valuable.

For more than 3000 years hinges have been serving man—without applause. But by passing unnoticed they serve their purpose best. A creaking, squeaking hinge ruins architectural perfection and cheapens expensive workmanship.

For fifty years McKinney Hinges and Butts have set a standard for architects and builders who take pride

in the buildings they create. To them the selection of hinges is part of their service and the name McKinney in a specification solves the hinge question permanently.

There is a McKinney Hinge or Butt to fit any architectural design. Whether for office building, home interior or barn door they combine artistic taste with practical everyday usefulness. There is a size to fill every hinge need perfectly—without interruption.

The McKinney illustrated catalog will be gladly furnished if you do not have one in your files. You will find it valuable in matching artistic designs and in meeting unusual hinge demands.

MCKINNEY MANUFACTURING
Western Office, State-Lake Bldg., Chicago

CO., Pittsburgh
Export Representation

MCKINNEY *Hinges and Butts*

Also manufacturers of McKinney garage and farm building door hardware, furniture hardware and McKinney One-Man Trucks



Von Duprin

Self-Releasing Fire Exit Latches

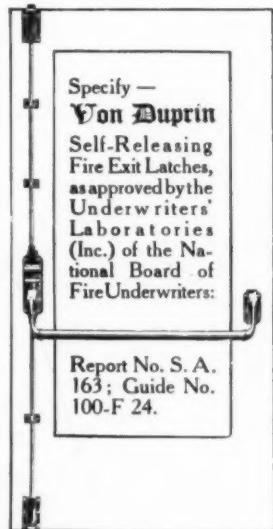
On Theatres

DUCE largely to the desire on the part of architects for a latch which would make safe exit certain for theatre audiences, Von Duprin Self-Releasing Fire Exit Latches have become standard equipment on the exit doors of theatres.

Some idea of the extent to which Von Duprin latches are used on theatres may be gained from the fact that in Chicago more than 44 theatres are Von Duprin equipped, in Philadelphia more than 41, in Indianapolis 24, and in other cities correspondingly large numbers.

Because they assure safe exit, once the inmates reach the doors, Von Duprin latches are essential for the doors of schoolhouses, theatres, factories and other buildings housing large numbers of people.

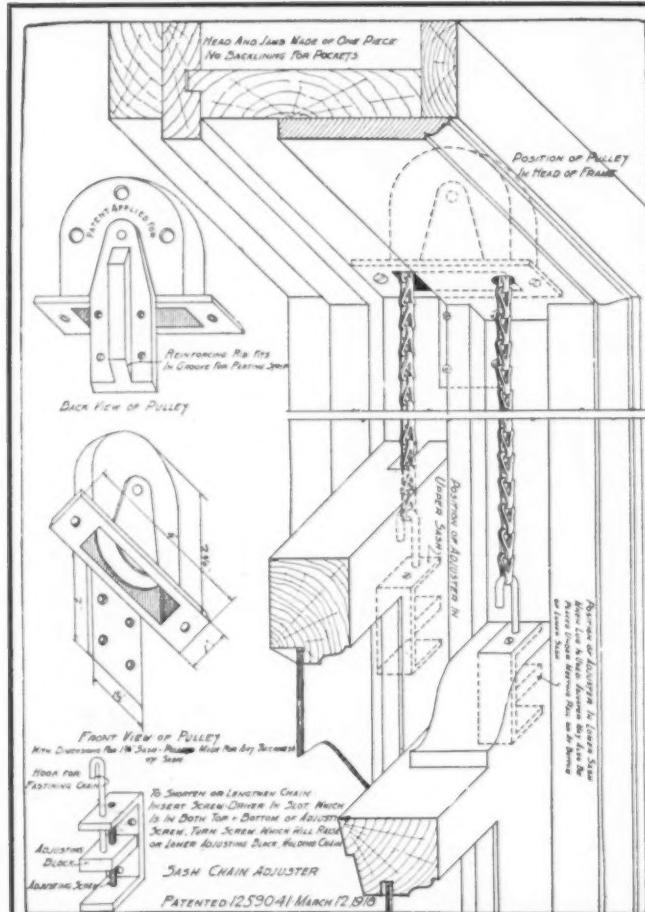
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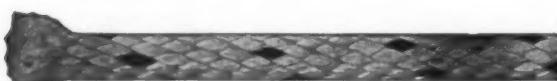
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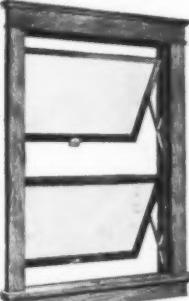
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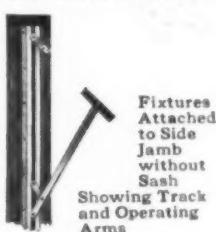


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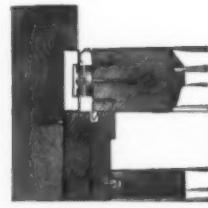
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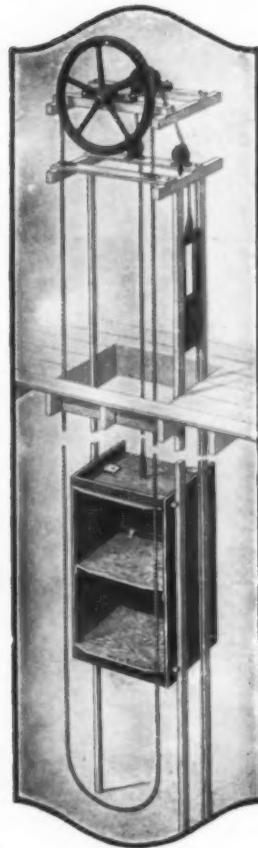
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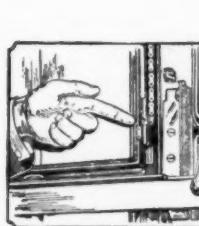
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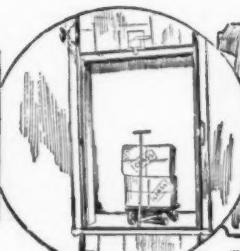


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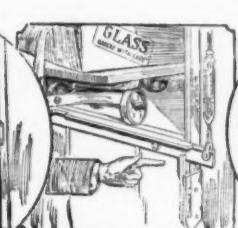
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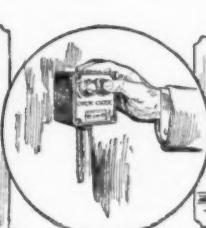
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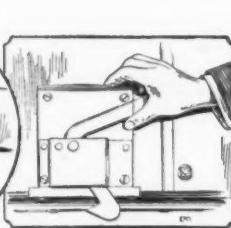
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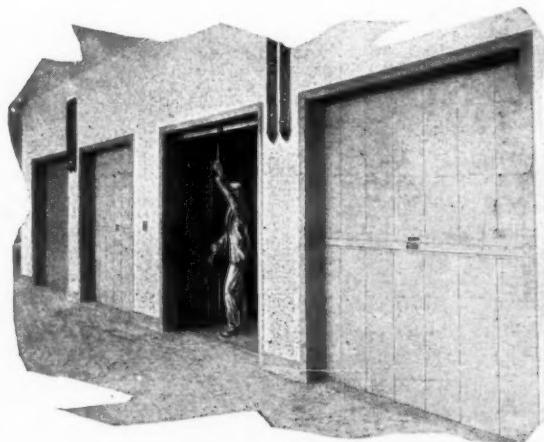
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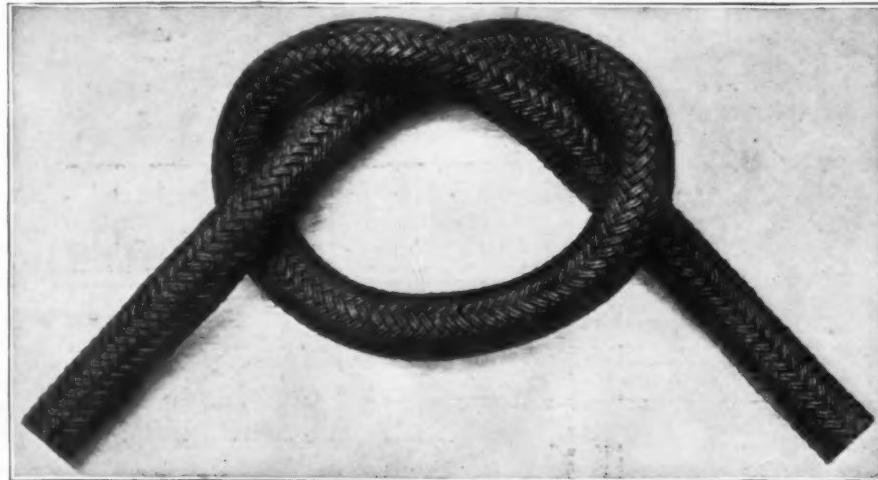
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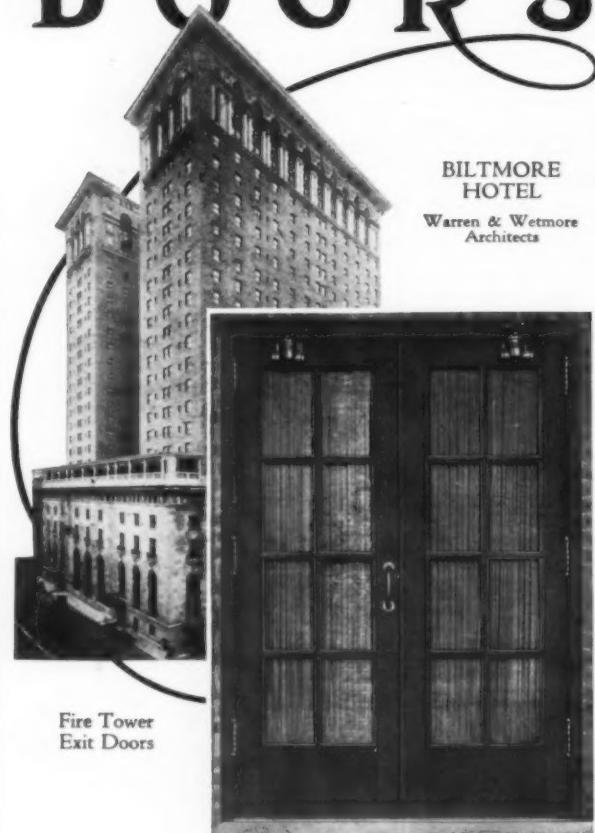
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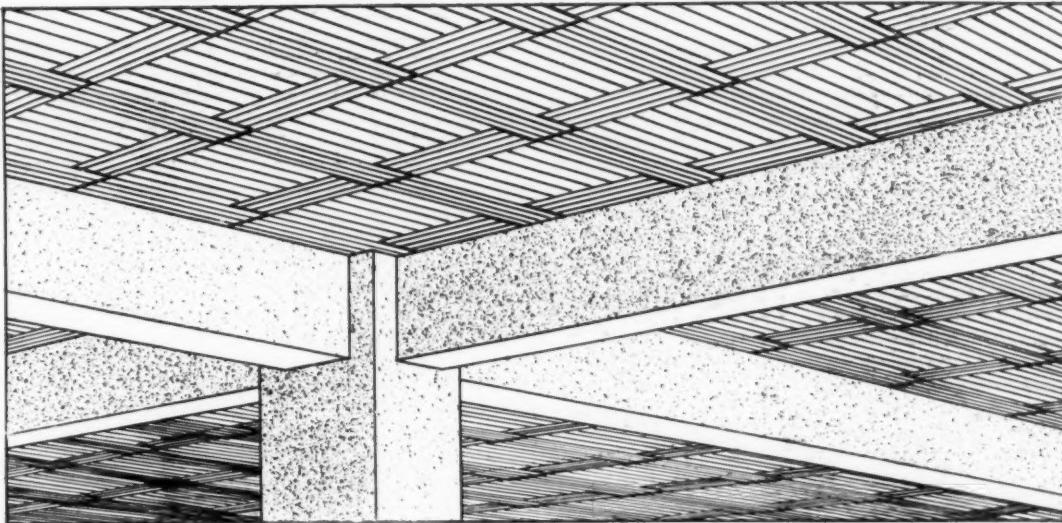
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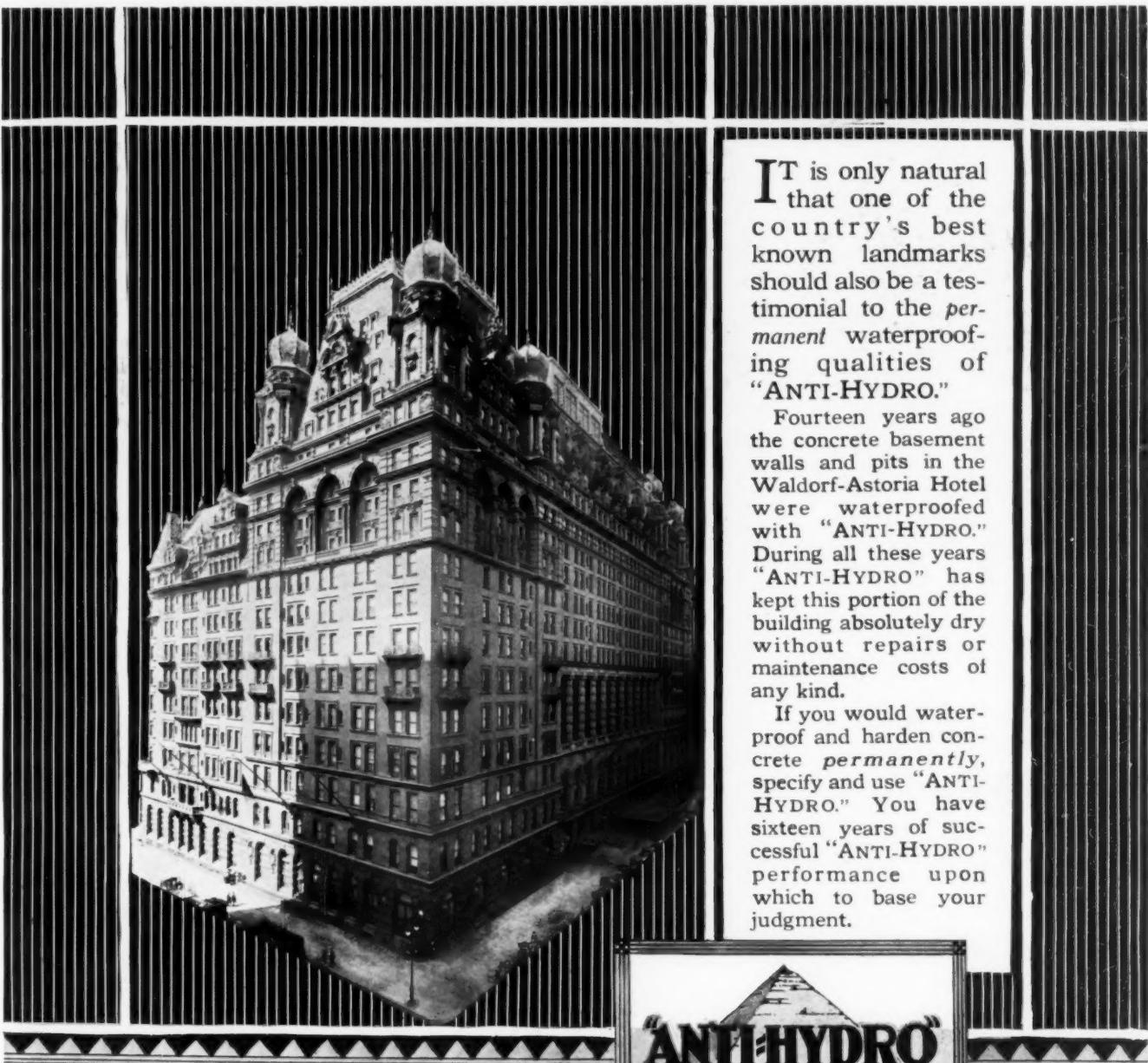
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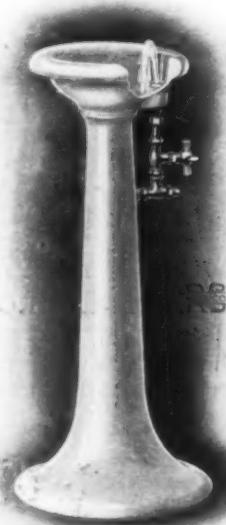
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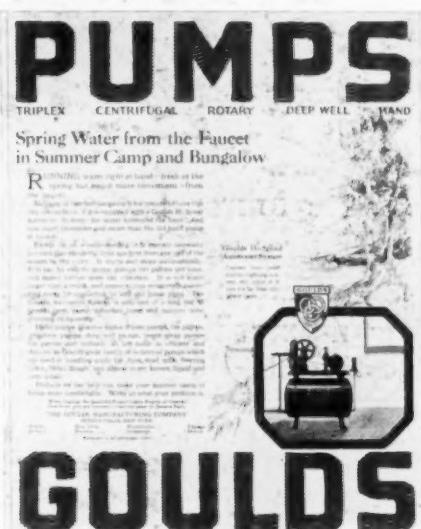


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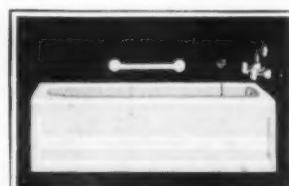
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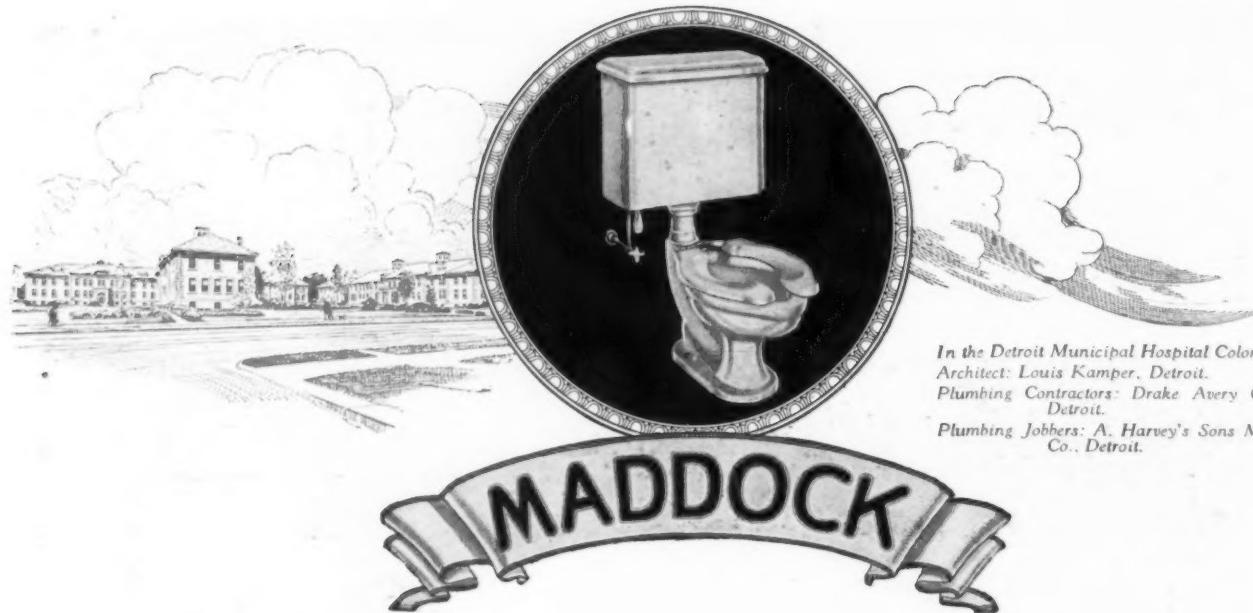
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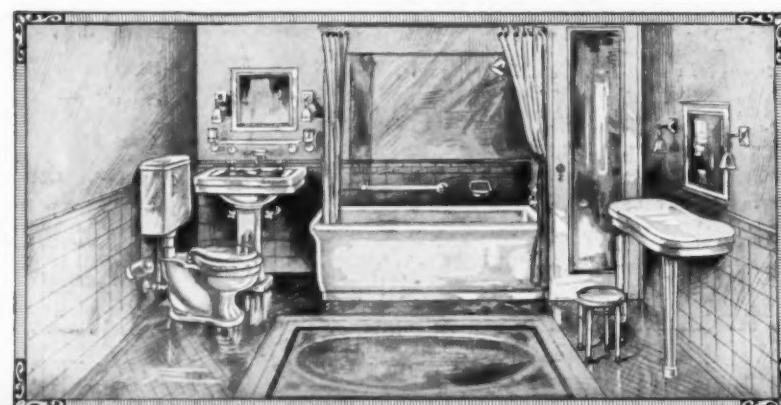
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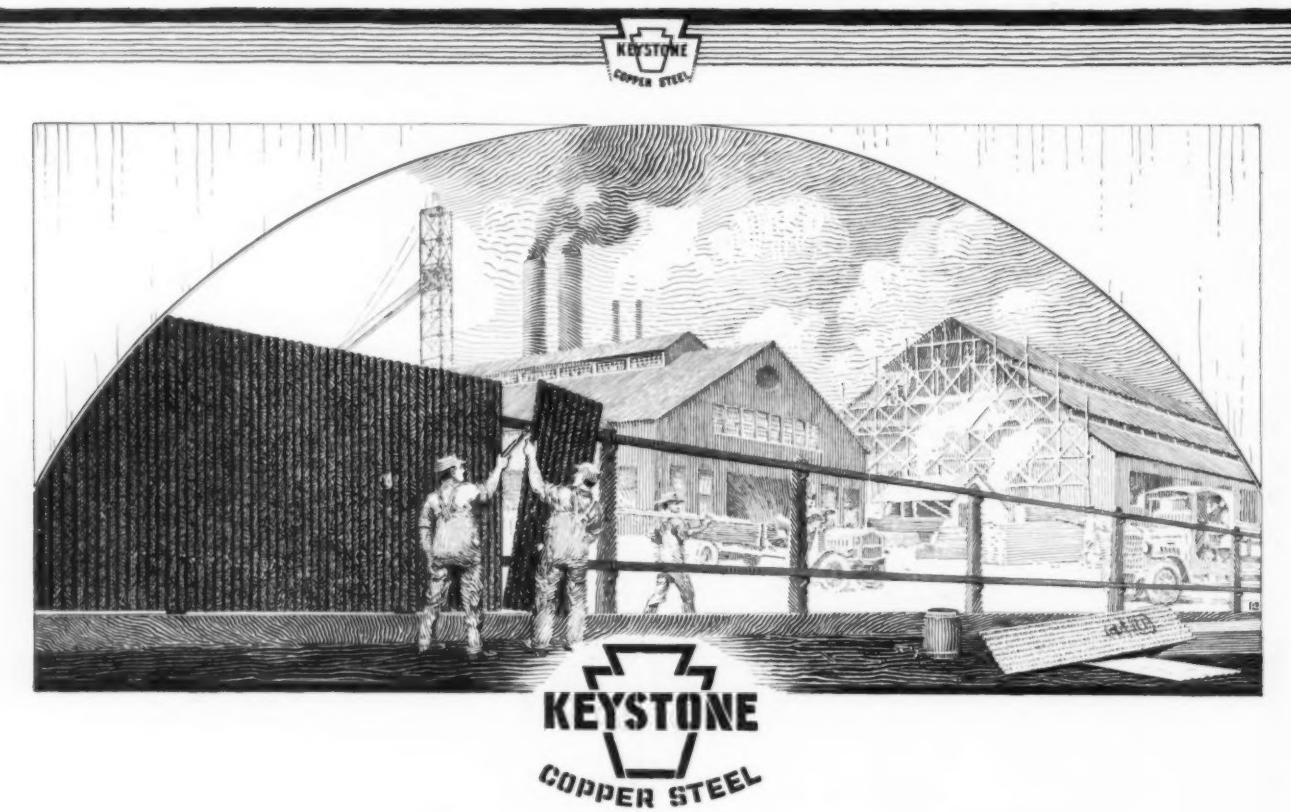
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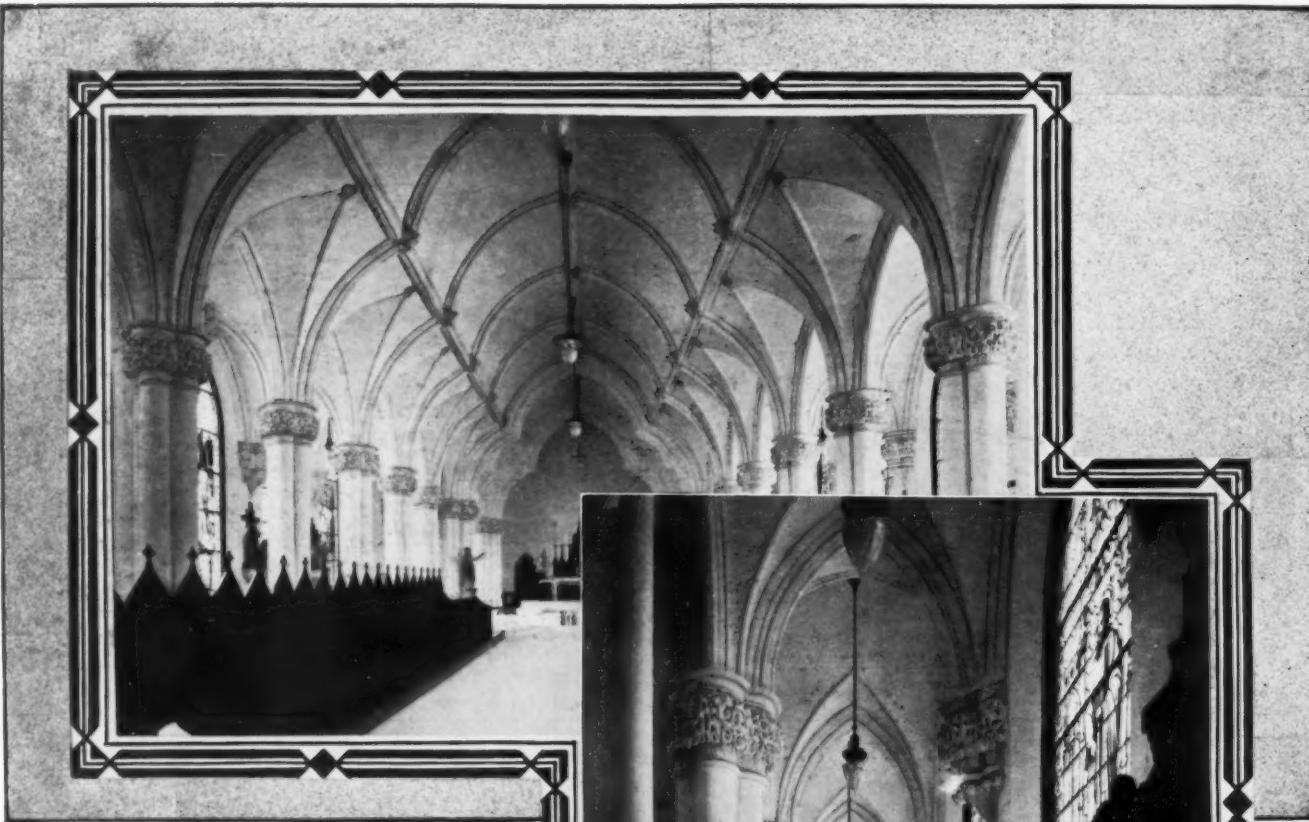
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METAL LATH

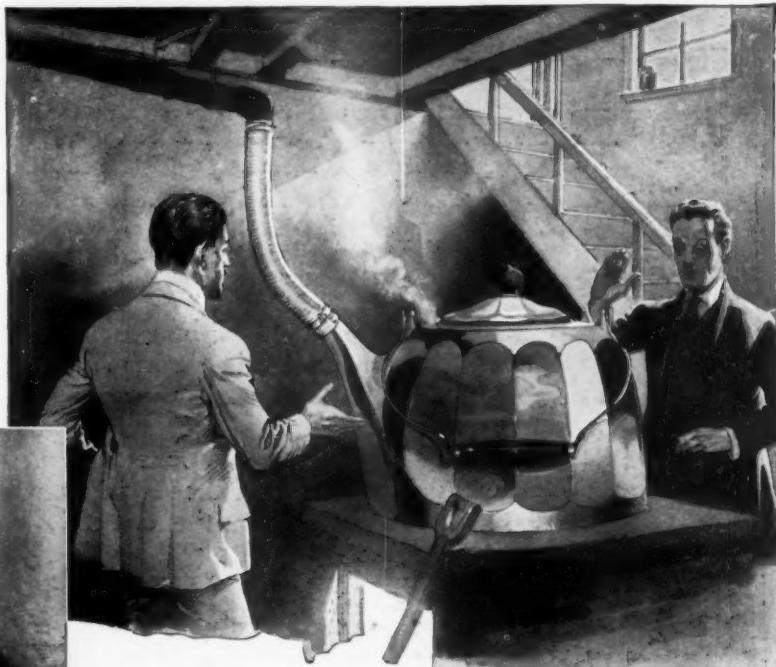
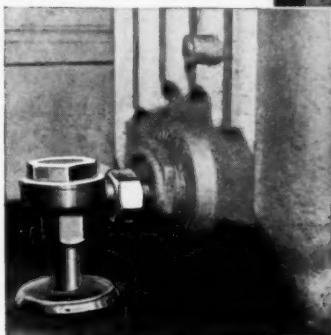
Not only is the cost reduced, but the steel mesh reinforces the plaster and provides a non-shrinking, fire-resisting base, which assures a permanently smooth surface, free from disfiguring cracks or streaks. Among the many buildings in which EUREKA or KNO-BURN Metal Lath has been used for interior work are the

Camden Library, Camden, New Jersey; Sisters of Mercy Chapel, Webster Grove, Missouri; First National Bank, Blackstone Hotel, Omaha, etc.

Samples of EUREKA or KNO-BURN with Handbook gladly sent



This small illustration shows how a Dunham Radiator Trap looks when fitted to a radiator. The trap is permanently adjusted at the factory—never needs attention.



It can be done if the tea kettle is large enough

For the good of the industry

Having materially contributed to the revolutionizing of low pressure steam heating by perfecting the Dunham Radiator Trap in 1893, we have always felt it our duty to continue the educational work. This our advertising in national publications is helping to do—acquainting all with the good features of low pressure steam heating.

In stating publicly that buildings can be heated with a tea kettle, if the kettle is large enough and each radiator Dunhamized, we have felt encouraging reactions all along the line. Even to some in the profession, it is surprising that even the Woolworth Building is heated on approximately one-pound pressure. Dunham Traps are used, of course.

"The Dunham Hand Book" supplements the data given in Sweet's Index, 14th edition, pages 1138 to 1143.

DUNHAM
REG TRADE-MARK
HEATING SERVICE

C. A. DUNHAM CO., Fisher Building, CHICAGO

Factories: Marshalltown, Iowa
Toronto, Canada

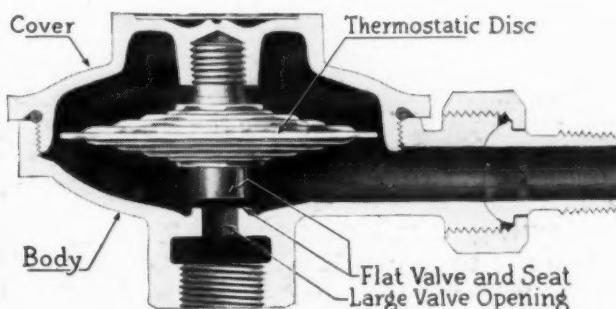
Branches in 36 cities in
United States and Canada

London: 64 Regent House, Regent Street, W. I.

Paris: Establis. Munzing & Cie., 47 Rue de la Fontaine-au-Roi

Dunham Specialties

Packless Radiator Valves
Radiator Traps
Drip Traps
Blast Traps
Air Line Valves
Vacuum Pump Governors
Reducing Pressure Valves
Oil Separators
Suction Strainers
Air Vents
Return Traps
Check Dampers
Damper Regulators



Cross-section of No. 2 Trap

THE DISTINGUISHED SERVICE LINE

EFFICIENT CONTINUOUS SERVICE FOR OVER FIFTY YEARS

That is the unusual record made by Page Boilers.

Manufactured with the utmost care and skill in designs proven through tests and long use to be most efficient, these "heat-makers" have come to be looked upon as standard by architects and engineers throughout the country.

Write for a copy of our latest catalogue

The Wm. H. Page Boiler Co.

The oldest and largest makers of boilers exclusively

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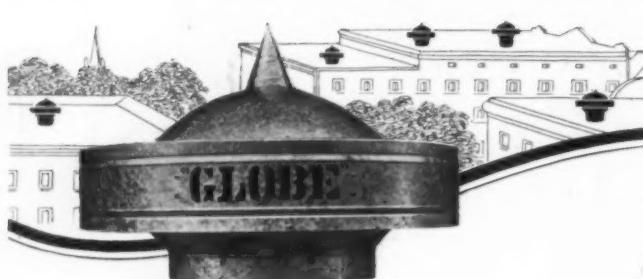
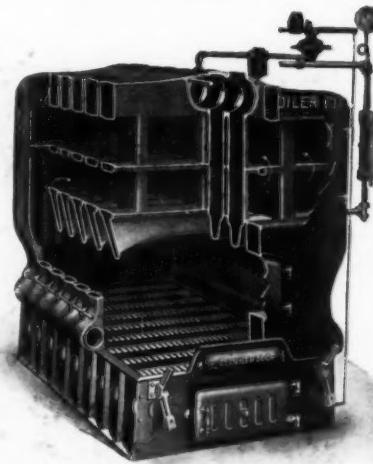
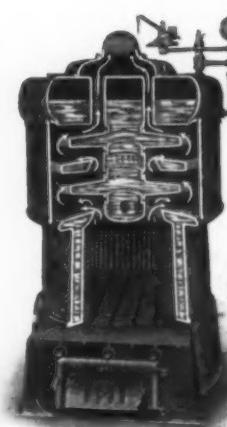
BOSTON
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Builders Exchange

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Makers of a complete line of Round and Square Boilers for every class of building



Wherever You See a "GLOBE"

Wherever you see a "GLOBE" Ventilator (distinguished by its distinctive shape) you may be certain that that building is properly ventilated and ventilated automatically.

Miniature working model Free to Architects who wish to prove the efficiency and demonstrate the simplicity of "GLOBE" Ventilators.

Your clients will appreciate your showing them this Miniature Demonstrator.

DEPARTMENT P

The GLOBE VENTILATOR CO., Troy, N. Y.



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Why Architects Everywhere Specify

Royal ^{Double} *Cone* *Ventilators*

Because — ROYAL Ventilators have the following exclusive features

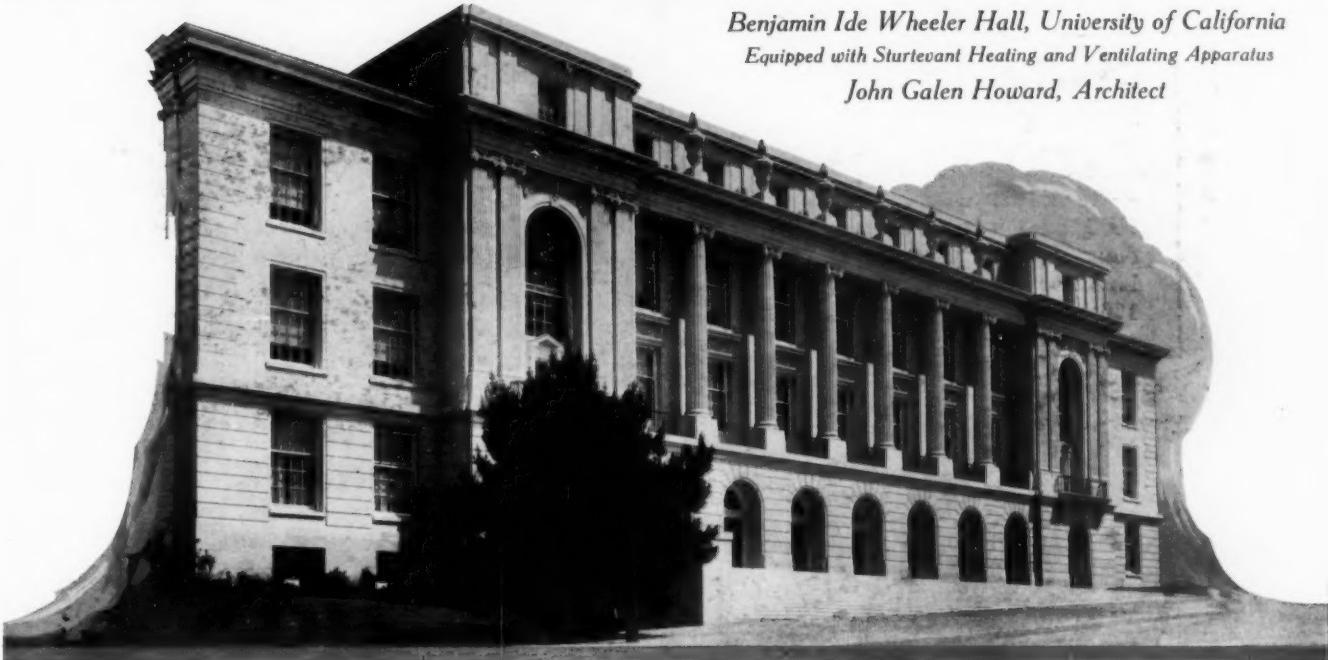
1. DOUBLE TAPERED OUTER FRUSTUMS.
The wind pressure deflected over and under the edges of the frustums constitutes a strong up draft.
2. THE INVERTED CONE.
Placed directly in the center of ascending air, which, upon striking it, is deflected directly upward and outward.
3. RADIATING RIBS IN THE CONES.
These prevent the air from swirling around, and also add to the firm construction.
4. STRENGTH AND RIGIDITY.
Edgewise galvanized malleable iron braces, lapped seams, wired edges.
5. GRACEFUL DESIGN.
They add to the appearance of every building.

See Page 812, Sweet's Catalog, or send for our catalog

Royal Ventilator Co., 415 Locust Street
Philadelphia, Pa.



*Benjamin Ide Wheeler Hall, University of California
Equipped with Sturtevant Heating and Ventilating Apparatus
John Galen Howard, Architect*



HEATING and VENTILATING SERVICE THAT MEETS EVERY DEMAND OF ARCHITECTURE

JUSTICE to a worthy example of architecture demands that the mechanical equipment of the building be thoroughly efficient so that no detail of operation may detract from the full enjoyment of the architect's creation.

The B. F. Sturtevant organization of expert engineers offers architects — and their engineers — the assurance of heating and ventilating service that will afford to any building, large or small, equipment economical in installation and efficient in operation.

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For quick, ready reference there are eighteen pages of helpful data on Sturtevant equipment in Sweet's Catalogue.



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A popular price hotel conducted on the European plan. Owned and controlled by Maryland Hotel Co. Erected in 1902. President—James H. McTague. Manager — Edward W. Dunn. Steward — William Reel. 1000 guests served daily in dining room. Has 240 rooms and 120 baths.



Architect, Albert B. Griggs

The Kitchens of the
HOTEL MARYLAND
(St. Louis)
are equipped with
"Wear-Ever"
Aluminum Cooking Utensils

"Wear-Ever" utensils are the logical equipment for hotels that appreciate the importance of maintaining a high standard of kitchen cleanliness and the good business of eliminating all unnecessary up-keep costs.

"Wear-Ever" utensils are clean, bright and silver-like. They have no joints or seams in which particles of food can lodge. Cannot rust; cannot chip — are pure and safe.

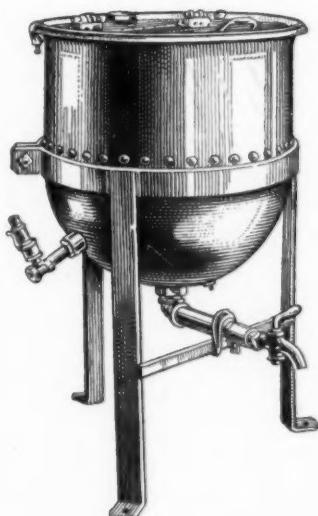
"Wear - Ever" never needs tinning!—A "Wear-Ever" equipment will be in use for years after it has saved its original cost on this one item alone.

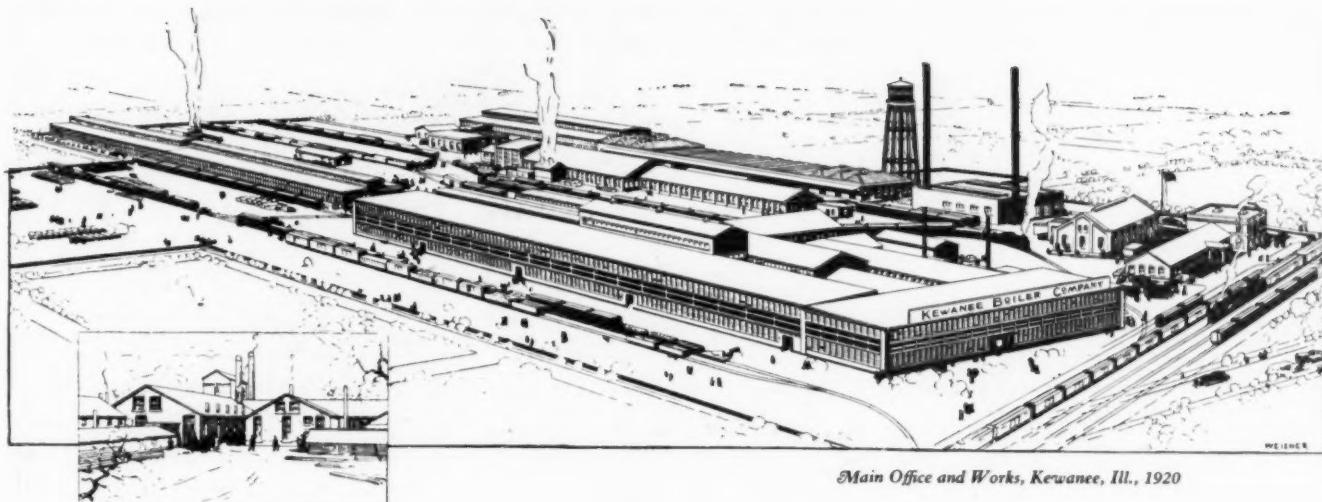
Replace utensils that wear out with utensils that "Wear-Ever"

See Sweet's Architectural Catalog and the American Architects' Specification Manual for specification data on "Wear-Ever"

The Aluminum Cooking Utensil Co., New Kensington, Pa.

In Canada "Wear-Ever" utensils are made by Northern Aluminum Co., Limited, Toronto, Ont.



*Main Office and Works, Kewanee, Ill., 1920**Main Office and Works, Kewanee, Ill., 1900*

20 Years of Progress

20 years ago less than two acres of ground were required. Today a boiler shop and radiator plant occupy a 32-acre tract of land.



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KANSAS CITY 2014 Wyandotte St.	SALT LAKE CITY Scott Bldg.	TOLEDO 629 Nicholas Bldg.
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- Cincinnati, O....Mercantile Library Building
- *Seattle, Washington.....Smith Building

*Warehouse Stocks at these points



"Star" Ventilators

PATENTED

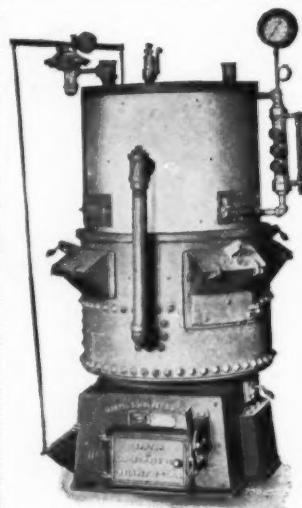
THE oxygen in fresh air is the primary support of life and nothing can compensate its absence.

Good ventilation will keep workers cheerful — it pays dividends in increased and better production.

"Star" Ventilators will solve your ventilating problems satisfactorily, as well as economically.

Send for our Ventilator Booklet

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Durability

of the Gorton Self-Feeding Boiler is demonstrated by the fact that many of the boilers installed over 25 years ago are still in use giving entire satisfaction.

Efficiency

The Gorton Self-Feeding Boilers are built on the lines of Power Boilers, using the same material, thus securing the greatest Strength, Durability, and highest Efficiency.

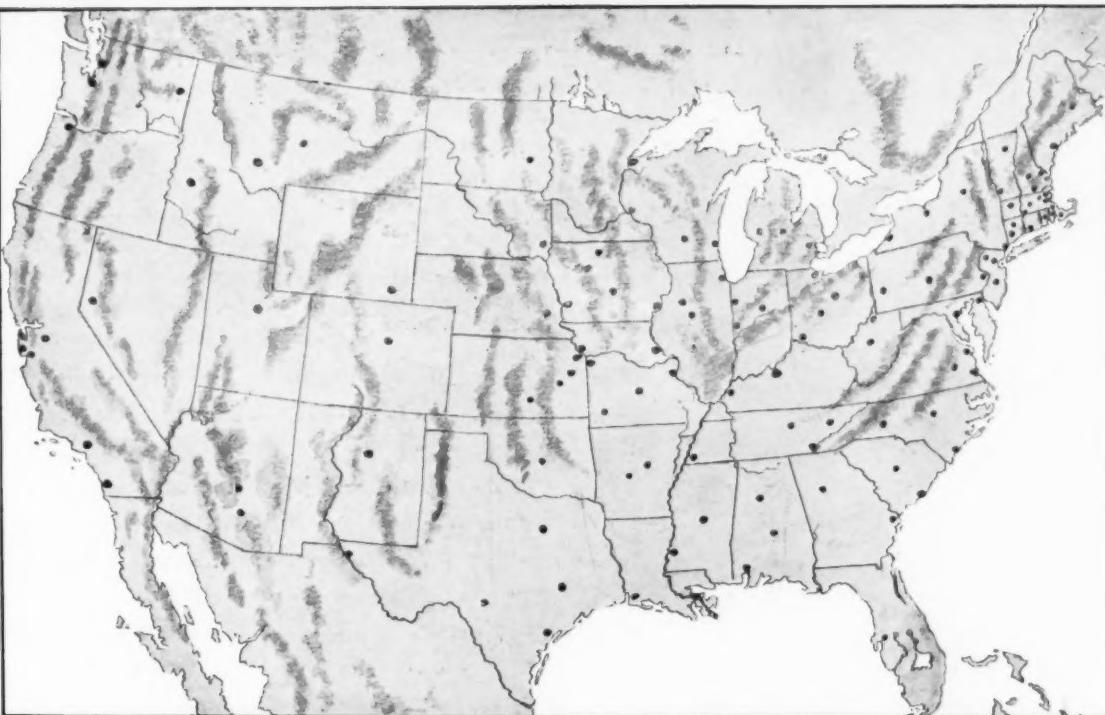
The Gorton Self-Feeding Boiler gives a steady heat with attention only morning and night; its construction insures complete combustion of the gases and prevents the waste of coal.

See pages 2, 3, 4, 6, 8, 10, 11, and 13 of Catalog No. 88.

OUR NEW NO. 88 CATALOG IS READY — WILL BE SENT UPON REQUEST

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96 Liberty Street, New York

All Gorton Self-Feeding Boilers built to the
"A. S. M. E. Standard"



The Black Dots Show Main Jobbing Points for "Riverside" Range Boilers

BUILT FOR THE NATION—

TRADE MARK
RIVERSIDE
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Riveted and Brazed Range Boiler

This National Distribution is a protection to your reputation and means a satisfied client. The "Riverside" stands up to high pressures all over the U. S. as well as low pressures. National Distribution means that all "Riverside" Boilers must be tested to excessive pressures so that no matter where they are installed they will stay tight.

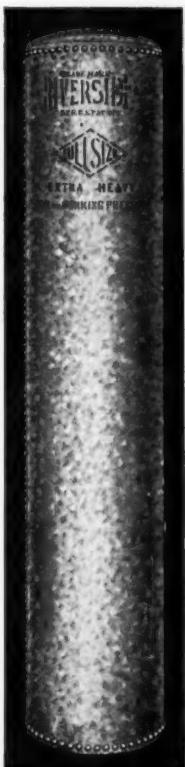
Specify "Riverside" "Kopsteel" Double Extra Heavy Range Boilers. They are guaranteed for six years at 150 lbs. working pressure. They will cost about one-third more than the ordinary boiler, but are well worth it.

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Riverside Boiler Works, Inc.

The Range Boiler Builders

Cambridge, Mass.



**NOVELTY
SMOKELESS BOILERS**

The advent of the Novelty Smokeless Boiler—the boiler with the carburetor—marks a tremendous step forward in the long fight to eliminate the smoke nuisance.

The Novelty Smokeless Boiler is the direct result of three lines of effort:

- First*—To prevent defacement of public and private property.
- Second*—To conserve public health and civic beauty.
- Third*—To eliminate the great waste that black smoke indicates.

And it is a matter of record that the Novelty Smokeless Boiler is a thoroughly satisfactory response to all three demands.

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Add to all this side feed construction and low water line and you have the ultimate in boiler construction and heating efficiency.

And the Flex-o-tuf formula used in all Novelty cast parts insures longer wear and consequently lower maintenance cost per year.

May we send circulars explaining this remarkable Boiler?

ABRAM COX STOVE COMPANY
American and Dauphin Sts., Philadelphia, Pa.

Makers of Novelty Hot Water, Steam and Vapor Boilers, Warm Air Pipe and Pipeless Furnaces, Coal and Combination Ranges, Laundry Stoves and Hot Water Supply Boilers, Fortune Gas Ranges and Gas Water Heaters.

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*American Exchange National Bank
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Heated by Imperial Super-Smokeless Boiler
John Bouchard & Sons Co.
Heating Contractors*

Even with Low Grade Fuel Results are Marvelous

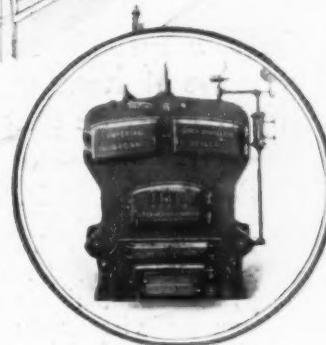
IN these days of uncertain fuel supply the man who owns an Imperial Super-Smokeless Boiler is fortunate. Whatever grade of fuel he is able to obtain, he can burn it successfully in this boiler without smoke, without special draft and with maximum economy.

This is due entirely to the Hot Blast Chamber located at the rear of the fire-box. Through this chamber must pass all gases and smoke. Here they are mixed with a stream of air (oxygen) and are completely consumed. Their high latent heat is applied to the water surfaces instead of being lost up the chimney.

Utica Heater Company - Utica, N. Y.

218-220 W. Kinzie Street, Chicago, Ill.

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We shall be pleased
to supply for your
files full data, a list
of installations and
opinions of archi-
tects and owners.

A 20-7

*Section through the
Hot Blast Furnace Chamber*

*of the Imperial
Super-Smokeless Boiler*

**Imperial
Super-Smokeless Boilers**

The Final Touch to the Heating System

YOU cannot specify a trained engineer in charge of heating boilers, but you *can* specify the device that will

Prevent Explosions and Cracked Sections

The Kelly Controller is the perfected result of years of effort to produce a simple, fool-proof device which will unfailingly and automatically correct every faulty condition that can develop in heating boilers—even when the heating system falls into the hands of the most unskilled operator.

It immediately meets impending dangers and forestalls accidents, restoring the boiler to normal operation.

Accorded the Fairbanks "O.K."

After rigid tests covering every condition that can arise in actual service, the Kelly Controller has received that well-known stamp of proven merit—The Fairbanks Company "O.K."

Stock carried by following Fairbanks branches

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BUFFALO	PATERSON	UTICA
CHICAGO	PHILADELPHIA	WASHINGTON
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When a slight surging condition occurs, the water which threatens to foam over into the system is deflected into the controller chamber and returned to the boiler through a bleeder pipe.

If ordinary steam separation is inadequate, an automatic water valve supplies the boiler with just enough feed water to reduce the temperature of the overheated surging water and correct the condition.

If, through carelessness or ignorance, the attendant continues to fire the overheated boiler, the controller goes a step farther and completely cuts off the boiler from the system, at the same time gradually reducing the water temperature. Since syphoning is impossible, explosions are absolutely prevented. Controller takes the place of the steam header and is just as easily installed.

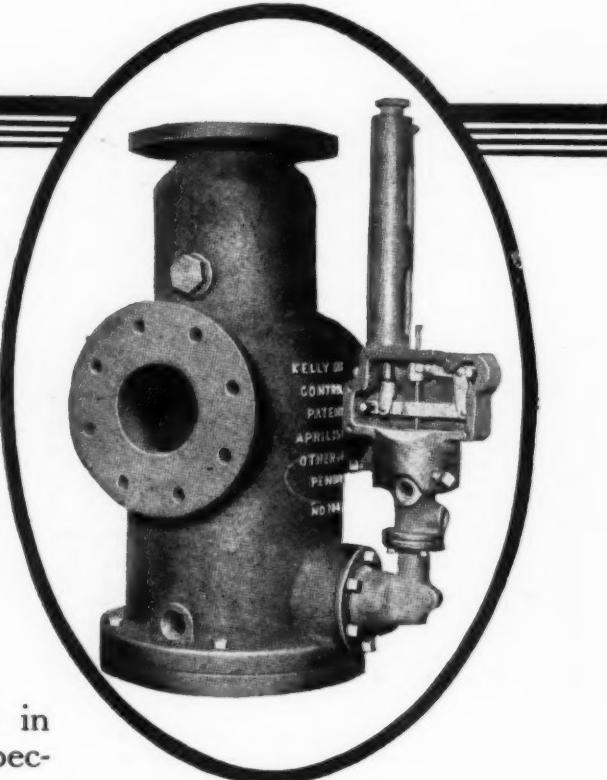
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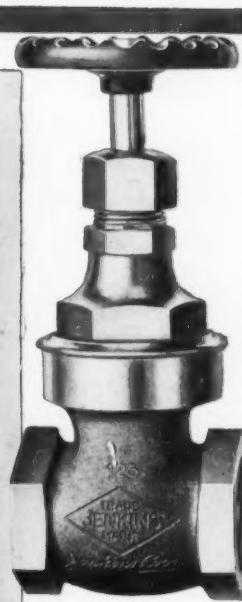
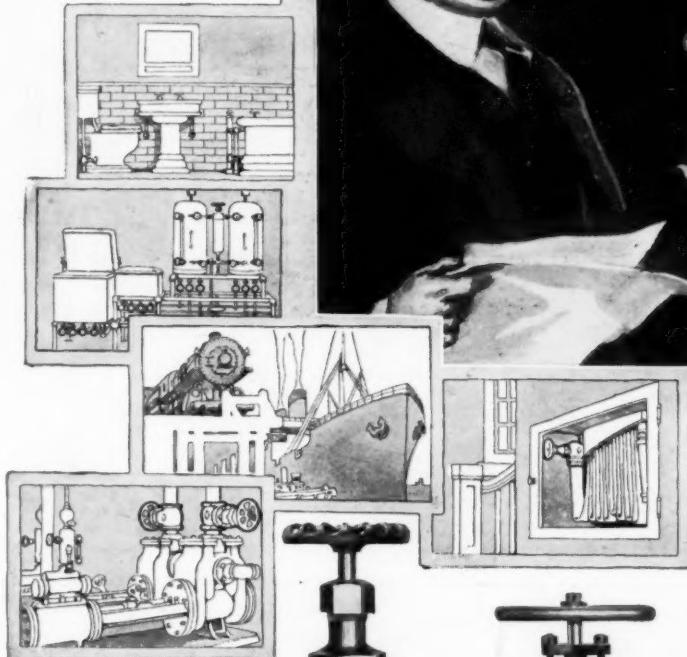
THE KELLY CONTROLLER CO.
175 West Jackson Boulevard CHICAGO

Distributed Exclusively by
THE FAIRBANKS CO., Administrative Offices : New York
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Kelly Controller

"The Boiler Master"





Assured Dependability

ARCHITECTS can specify, engineers can recommend, plumbers and steamfitters can install Jenkins Valves with confidence born of a knowledge that Jenkins Valves have been standard for more than 55 years. Home owners having plumbing and heating systems equipped with Jenkins Valves are assured of dependability and freedom from valve annoyance.

Every Jenkins Valve is strong and heavy; made of the best brass, iron or steel, and so proportioned that it remains dependable and unaffected when subjected to the strain of hard usage and severe service.

The valves illustrated are of the types commonly used in plumbing. Jenkins Valves are also made to meet the requirements of power plant service, high and low pressure; of plumbing and heating service in the home, office, factory, hospital and public building; of railroad, roundhouse and marine service; and of any service where a substantial, satisfaction giving valve is demanded.

SPECIFY: All valves shall be genuine JENKINS, bearing the name "JENKINS" within a diamond mark.

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SINCE 1864

Leaders in the Hotel, Industrial and Institutional World Favor—



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And they recommend it to others who are faced with perplexing food-cooking and serving problems.

Van always has been foremost in the designing of the most *improved* equipment for efficient and economical preparation and service of food.

The same detailed care is exercised in planning and effecting the installation in your building.

Tell us your culinary problems. Let us help you solve them.

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EQUIPMENT FOR THE PREPARATION AND SERVING OF FOOD
Cincinnati

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Myron Hunt & Elmer Grey, Architects

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PERMANENT beauty. That's the kind that one or two applications of Bay State Brick and Cement Coating imparts to all walls of brick, cement or stucco. It waterproofs them, too. No rain, sun, or storm affects its protection and lasting qualities.

Your choice of white or a range of colors. We will send you a sample of any tint you wish. Let us mail you Booklet No. 10. It shows a number of Bay State Coated Homes. Drop us a postal.

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Paint and Varnish Makers
BOSTON, MASS.

New York Office, Architects Building
Philadelphia Office, 1524 Chestnut Street



Greater Beauty "CREO-DIPT" Stained Shingles

For a home exterior of infinite beauty and practicality, specify "Creo-Dipt" Stained Shingles which merit deepest approval also for their true first-cost and upkeep economy.

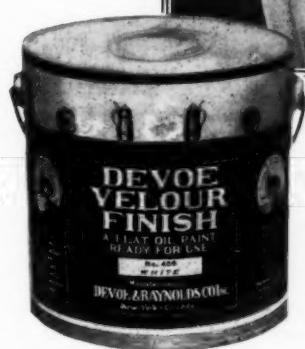
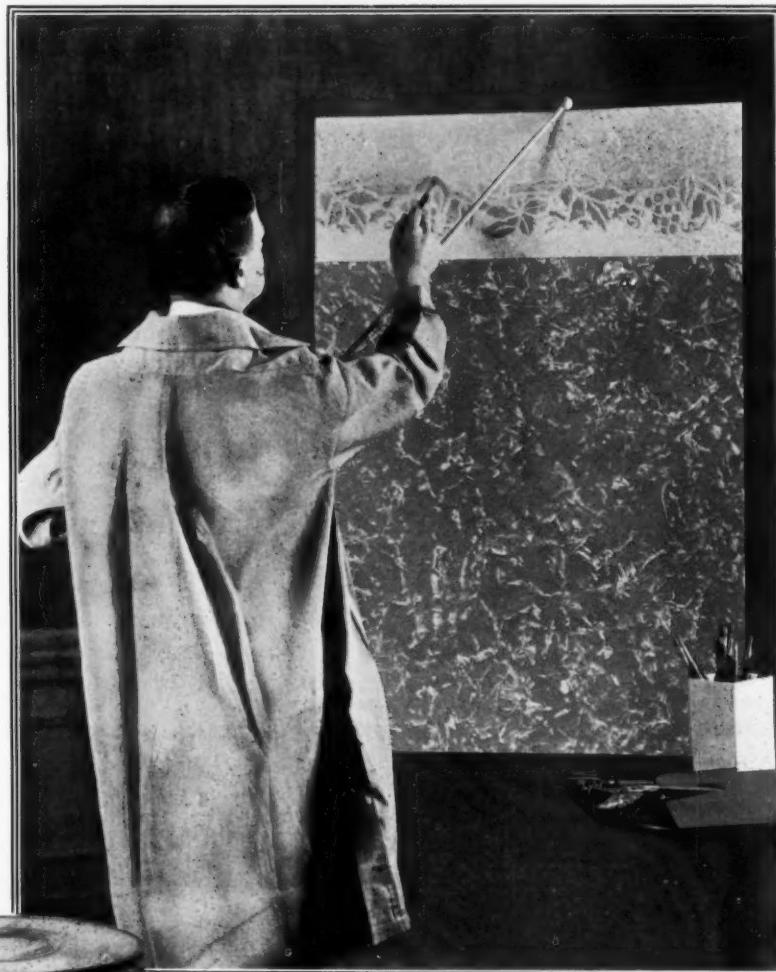
Each shingle is stained separately, uniformly and permanently one of 30 beautiful shades of red, brown, green, gray. Bundled ready to lay. Proof against dry-rot and weather.

For delightful suggestions, send today for Portfolio of Homes and Color Samples. Ask about "Creo-Dipt" Thatch Roofs; 24" Dixie White Side Walls.

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DEVOE VELOUR FINISH



Devoe Velour Finish is the perfect flat finish, washable oil paint for all interior walls, woodwork and ceilings.

Its perfect blending qualities allow a unique yet simple method of manipulation producing many beautiful Mottletone effects.

Our Decorative Service Department has worked out harmonious color schemes for a number of large public institutions and private homes and will be glad to submit decorated panels for your inspection.

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*The oldest paint manufacturing concern
in the United States. Founded 1754*

Devoe & Raynolds Co., Inc.

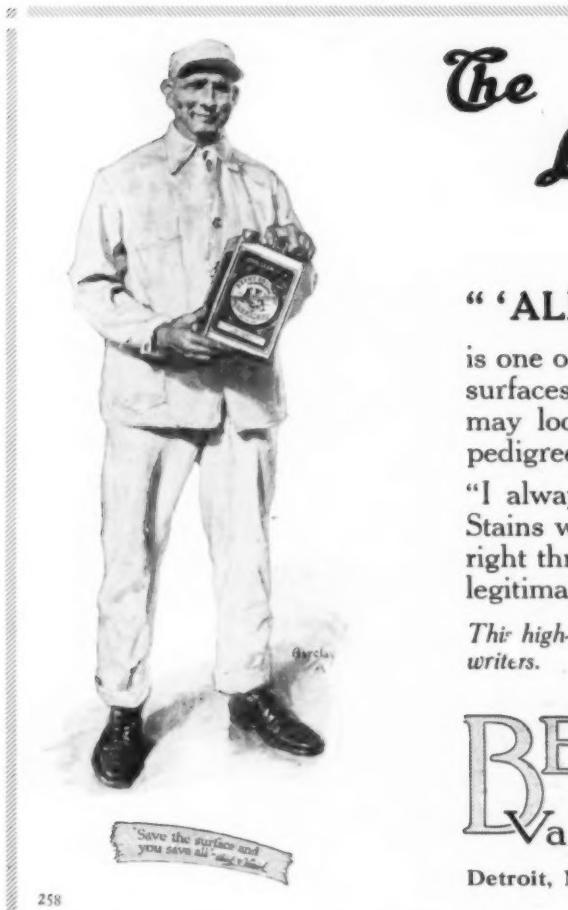
NEW YORK
101 Fulton Street

Paints



CHICAGO
14 West Lake Street

Varnishes



The Luxeberry Painter Says:

"ALL IS NOT GOLD THAT GLITTERS"

is one of the old sayings I think of when I see finished surfaces with the lustre faded out. Even a shoddy varnish may look handsome for a while, but it soon betrays its pedigree like a gold-plated watch case.

"I always use Berry Brothers' Varnishes, Enamels and Stains whenever I can because I know they are pure gold right through, combining lasting beauty with the greatest legitimate economy."

This high-grade efficiency is an especially valuable asset for specification writers.

BERRY BROTHERS^{INC.}
World's Largest Makers
Varnishes and Paint Specialties

Detroit, Michigan

Walkerville, Ontario

Considering Cypress' distinctive and unequalled merits, it is no wonder that
**"CLIENTS ARE
GETTING IN-
TERESTED IN
TRADEMARKED
"TIDE-WATER"**

CYPRESS

(The Wood Eternal)"

They ought to be interested. It's good for them.
**SPECIFY ABOVE MARK—INDELIBLY
STAMPED ON EVERY BOARD OR BUNDLE.
JUST TELL YOUR DEALER YOU KNOW
THE DIFFERENCE. (HE DOES, TOO.)**

Communicate with our "ARCHITECTS' DEPARTMENT." Our entire resources are at your service with Reliable Data.

Southern Cypress Mfg. Ass'n.

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Building, New Orleans, La.

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Building, Jacksonville, Fla.

INSIST ON TRADE MARKED CYPRESS AT YOUR LUMBER
DEALER'S. IF HE HASN'T IT, LET US KNOW IMMEDIATELY.



Nearing the Century Mark in
VARNISH MAKING

Our products have been specified by architects continuously for ninety-three years. What endorsement could be greater?

Trade **Artisto Finish** Mark

Years of use have proved
its durability—its economy

Produces a rich, dull, artistic finish over natural wood or stained work. Accentuates the beautiful grain of the wood and its coloring, with a freedom from defects too often the result of wax finish.

Will not scratch or mar white. Is waterproof. Dries hard overnight.

We also manufacture highest grade, guaranteed Enamels and Floor Finishes.

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P. O. Box 76, City Hall Station, New York City
Western Branch, 3532-34 South Morgan Street, Chicago



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Architectural Finishes
 Include a complete line of Stains

DESIGNED for use in the very highest class of woodwork finishing. The range of colors enables architects to obtain practically any stain effect desired. They are absolutely dependable in permanence and uniformity of color, and embody the most practical working qualities—great penetration, and enhancement of wood-character without raising grain. Made in spirit, acid and oil types.

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DEPARTMENT OF ARCHITECTURAL SERVICE
 THE SHERWIN-WILLIAMS CO.
 801 CANAL ROAD, N. W., CLEVELAND, OHIO



Sound Lumber for Over a Century

Over a century ago Russian settlers at Fort Ross, on the northern coast of California, built this picturesque Greek chapel, using only Redwood, hewn from the forest with a primitive broadax. Up until the time of the earthquake of 1906, this building stood intact. In 1915 it was restored by the state, using the original Redwood from which it was built—a remarkable proof of the long-lasting qualities of that wood.

The long life of Redwood, and its remarkable resistance to rot, has made it a valuable lumber for all general building purposes—foundation posts, mud-sills, curbing, weather boards, siding, sheds, pergolas, greenhouses, factory and mill roofs. Redwood is also excellent in engineering and industrial construction, and for the manufacture of wood specialties—tanks, silos, casket

shells and boxes, beehives, ice-cream cabinets, battery separators, candy and cigar boxes, incubators, pipe organs, etc.

Redwood also resists fire to a remarkable degree, due to its freedom from pitch or resin. When properly seasoned Redwood will not shrink or swell, and is easily worked. Takes paint exceptionally well.

Gradually increasing knowledge of the unusual and peculiar properties of Redwood for many building, industrial and specialty purposes, has resulted in a demand for this lumber to the extent of taxing the present facilities of the Redwood mills. The mills are making every effort to enlarge their production to take care of the increased demand. There has also been a persistent demand from lumber users and prospective users for further information about this remarkable wood, and this series of advertisements is for the purpose of providing such information.

CALIFORNIA REDWOOD ASSOCIATION
760 EXPOSITION BUILDING, SAN FRANCISCO

California Redwood
Resists Fire and Rot

*Douglas Fir
Northern White Pine
Idaho White Pine
Western Soft Pine*



*Western Hemlock
Washington Red Cedar
Red Fir and Larch
Norway Pine*

HOW THIS TRADE-MARK FIXES RESPONSIBILITY FOR YOUR LUMBER PURCHASE

WOOD is one of the oldest and most universal materials of civilization.

Yet people know less about it than about almost any other thing they buy and use.

Even the buyer of a great industrial concern, with all his special knowledge—the man who selects a motor truck or a dynamo with perfect confidence—is likely to order lumber without full consideration of the service he expects of it.



Some of the best commercial woods are little known in some sections of the country where higher prices are paid for inferior species. Industries specify a kind of wood through habit, or the practice of the trade, without knowing that a better kind is available.

Think what it would mean to the great industrial plants of the Middle West and the Eastern Seaboard to know the qualities of Douglas Fir—to be able to buy this wonderful structural timber, and to be sure of uniform quality by the trade-mark of a responsible producer.

As substantial factors in the lumber business, the Weyerhaeuser people want you to think more about the wood you use.

To this end we will supply to lumber dealers and to the public any desired information as to the qualities of different species and the best wood for a given purpose.

This service will be as broad and impartial as we know how to make it. We are not partisans of any particular species of wood. We advise the best lumber for the purpose, whether it is a kind we handle or not.

What we advocate is conservation and economy through the use of the right wood in its proper place.

Think how this service on lumber would benefit the farmer in his building and repairs—the home-builder in his investment in a house.



From now on the Weyerhaeuser Forest Products trade-mark will be plainly stamped on their product. You can see it for yourself at the lumber yard or on the job after it is delivered.

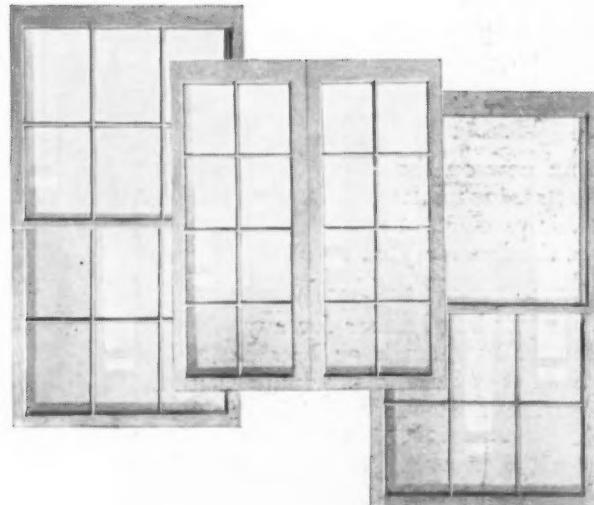
When you buy lumber for any purpose, no matter how much or how little, you can look at the mark and know that you are getting a standard article of known merit.

WEYERHAEUSER FOREST PRODUCTS SAINT PAUL • MINNESOTA

Producers of Douglas Fir, Western Hemlock, Washington Red Cedar and Cedar Shingles on the Pacific Coast; Idaho White Pine, Western Soft Pine, Red Fir and Larch in the Inland Empire; Northern White Pine and Norway Pine in the Lake States.

Long-Bell

WHITE PINE
DOORS *and*
WINDOWS



FREE BOOKLET, "THE PERFECT FLOOR"
How Oak Floors should be *Laid, Finished and Cared For.* Information every builder and home owner should know.
Send a post card to-day

Long-Bell doors and windows, made at Weed, California, are known to be of the highest quality—yet they cost no more.

—Ask Your
Lumberman

Long-Bell products include California White Pine Doors, Veneers, Sash, Lumber, Standardized Wood-work; Southern Pine Lumber and Timbers; Creosoted Lumber, Timbers, Posts, Poles, Ties, Piling, Wood Blocks; Oak and Gum Lumber, Oak Flooring.



The Long-Bell Lumber Company
R. A. LONG BUILDING Lumbermen since 1875 KANSAS CITY, MO.

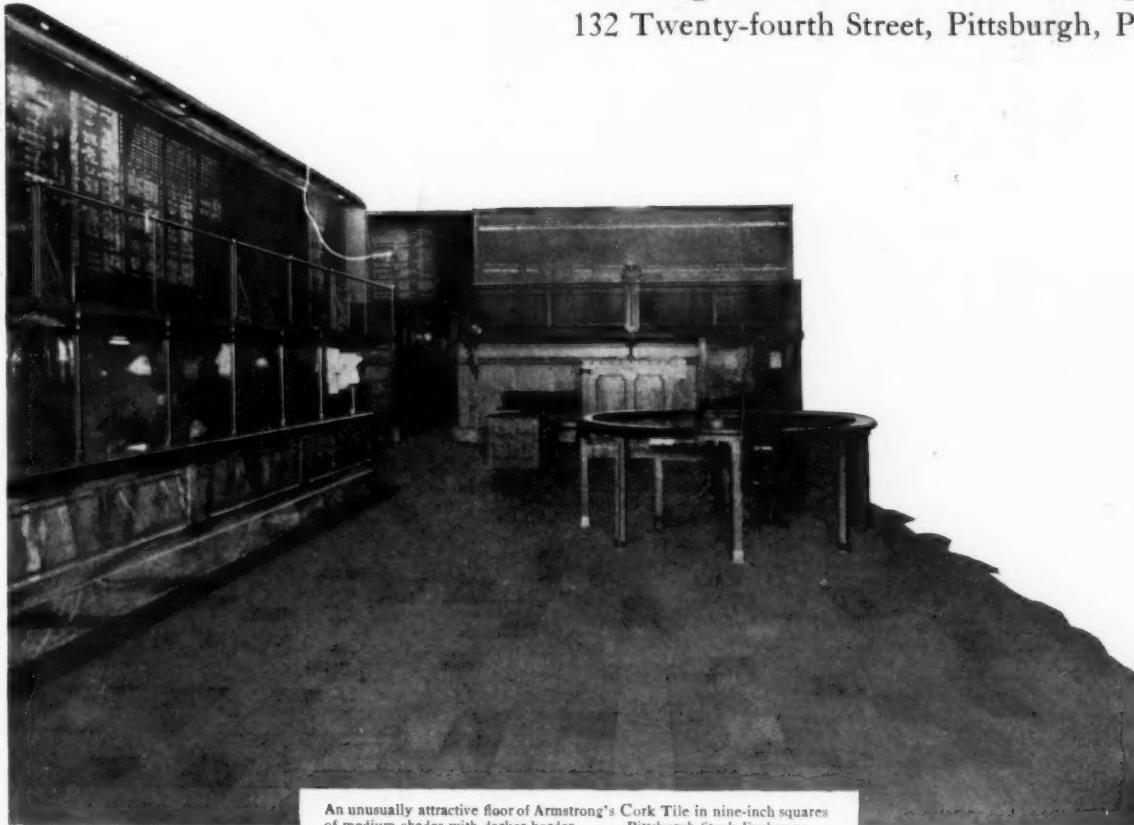
Features That Characterize a Floor

DISTINCTIVE character or identity has the same value in a product that personality has in a man. To be peculiarly itself in aspect and performance and not an imitation of something else is decidedly a virtue.

Armstrong's Cork Tile has that quality of individuality. It makes no pretense of being other than what it is—cork. It is not made to resemble wood, or marble, or tile, or carpet. It has no color or grain not inherently its own.

And in the characteristics of Armstrong's Cork Tile lies its peculiar charm. No more pleasing effect, for example, could be desired than that obtained with its distinctive mottled appearance in soft shades of brown. So, too, with its "feel" underfoot—not merely soft and yielding, but with the lively resilience of natural cork—a comfortable, warm, non-slippery and noiseless floor.

Armstrong Cork & Insulation Company
132 Twenty-fourth Street, Pittsburgh, Pa.



An unusually attractive floor of Armstrong's Cork Tile in nine-inch squares
of medium shades with darker border. Pittsburgh Stock Exchange

ARMSTRONG'S CORK TILE



REGISTERED

U.S. PAT. OFF.

90,000 Square Feet of Floor Space *Treated with*



GF No. 145 Crystalrox

A concrete hardener that insures your floors against crumbling and dusting.

Sperry Flour Company treated the floors of their new building with Crystalrox in March, 1918. It has proven successful.

1 GF No. 145 prevents all concrete surfaces from dusting and crumbling.

2 GF No. 145 is a concrete floor insurance. It insures a perfect floor for years.

3 GF No. 145 can be applied after a day's work is done and the floor is ready for use the following morning.

4 GF No. 145 is a perfect hardener. Satisfied customers are the best proof. Read the letter of one of the many satisfied users.



GENERAL OFFICES
SAN FRANCISCO
CABLE ADDRESS "SPERRY"
AC CO 2214, 5TH EDITION
LAWRENCE STANDARD COAL
FIRE COKE

PLANT MORE WHEAT
SPERRY FLOUR CO.

MILWAUKEE
FIREPROOFING COMPANY
SPRINGFIELD, MASS.
WALLACE, CAL.
MONTGOMERY, CAL.
TAMPA, FLA.
NEW ORLEANS, LA.

Spokane, Washington,
October 26th, 1920.

D. E. Fryer & Company,
Paulsen Bldg.,
Spokane, Washington.

Gentlemen: Attention: Mr. Hoffman.

In response to your request for information as to the service that the floor hardener which was used in this building was giving us, will reply as follows.

The writer, while not actually here during the building operation, is thoroly familiar with the fact that Crystalrox as manufactured by the General Fireproofing Company and sold through your concern was applied over some 90,000 sq. ft. of floor area in this building. This material was applied in March, 1918, and the floors have given excellent service since that time and upon inspection on this date, over two and one-half years later, find that they are in perfect condition in spite of the heavy trucking over certain areas.

Consequently we do not hesitate to recommend Crystalrox as an excellent floor hardener.

Yours very truly,
SPERRY FLOUR COMPANY.
By J. K. Smith

THE GENERAL FIREPROOFING COMPANY
YOUNGSTOWN, OHIO

BUFFALO
OMAHA

CHICAGO
ATLANTA

NEW YORK
MINNEAPOLIS

BOSTON
SAN FRANCISCO

MILWAUKEE
PHILADELPHIA

KANSAS CITY
BALTIMORE

(SONNEBORN PRODUCTS)

*"Concrete Floors need not
Dust or Wear!"*

From the viewpoint of *investment value*, concrete floors are the most economical type because they are permanent, fireproof, sanitary and practically repair-proof when treated with

LAPIDOLITH
TRADE MARK

This original liquid chemical dustproofer and wear-preventer makes concrete as hard as granite by completing the hydration of the cement.

There are now approximately two hundred million square feet of lapidolized concrete floors in use.

Let us refer you to a lapidolized floor in your immediate vicinity. Then you will specify Lapidolith for your client's old or new floors, and so prevent concrete dust and the expense of repairs.

*Sonneborn Products:**Cemcoat*

the durable Mill White. Washable, of exceptional covering capacity. Gloss, Flat and Eggshell; also all colors.

LIGNOPHOL
FOR WOODEN FLOORS

the modern wood preservative, gives new life to old or new wooden floors.

Write for scientific proof and sample of hardened concrete.

*For full information address
our Technical Department.*

L. SONNEBORN SONS, INC.
Dept. 4 264 Pearl St., New York

(SONNEBORN)

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HY-RIB



Hy-Rib Saw-tooth Roofs before Concreting, Oliver Chilled Plow Co. Prack & Perrine, Architects

Quickly Erected, Concrete Roofs

The most practical roof for present-day needs is the Hy-Rib concrete roof. Fireproof, permanent and light in weight this roof is rapidly and economically erected without the use of forms and with minimum labor.

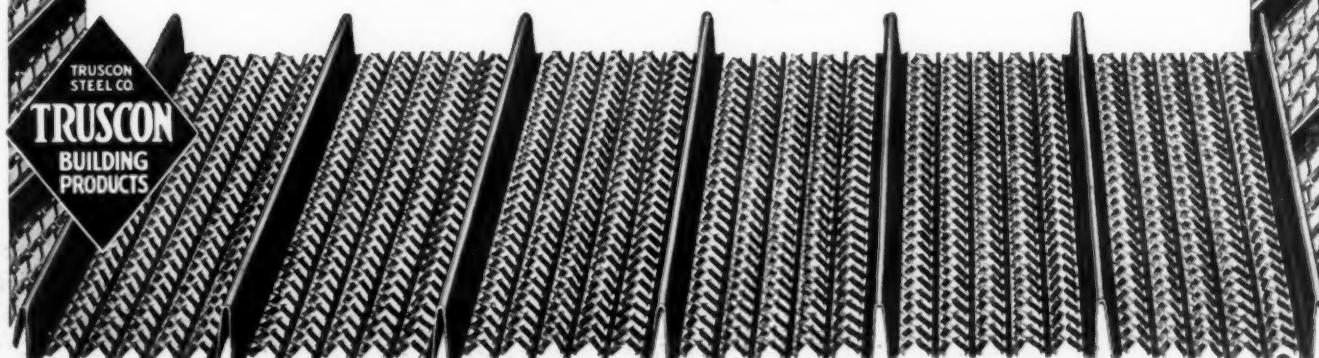
Hy-Rib is a steel mesh stiffened by rigid ribs all manufactured from a single plate. The Hy-Rib sheets are set in place, the concrete applied and the under surface plastered. The construction is very simple and rapid—no forms nor special equipment are required.

The Hy-Rib concrete roof is light in weight, using little material and is erected by few workmen. This thin slab effects a great saving in dead weight and reduces the size and cost of roof members, columns and foundation.

Thousands of manufacturers have availed themselves of the advantage and economy of Hy-Rib not only for roofs but also for sidings, partitions, ceilings, floors, etc. Investigate Hy-Rib for your prospective building by writing to-day for Hy-Rib book.

TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO

Warehouses and Sales Offices in Principal Cities



**THE BRUNSWICK-BALKE-COLLENDER CO.
WHALE-BONE-ITE
CLOSET SEATS**

THE QUALITY TOILET SEAT

CUT SHOWS
NO. 23-9 SEAT

CONSTRUCTION OF
WHALE-BONE-ITE SEAT

D—NOTE CONCEALED HINGE
C—NOTE HEAVY COVERING
B—RUNS LENGTHWISE
A—NOTE THE COUNTER LAYER OF LAMINATION—THIS RUNS ACROSS SEAT

*Industrial Plants Toilets
Demand Seats that are Durable and Readily Cleaned*

WHALE-BONE-ITE is being used in a large number of plants whose Engineers have thoroughly tested the Seat both academically and in use.

- Result--Satisfactory proof of our claims.
- WHALE-BONE-ITE is impervious, shows dirt readily account of high lasting polished surface, which is not superficial but thick, which wears a lifetime.
- No metal hinges on top or bottom.
- Our patented concealed hinges are rigid and fool-proof--reducing corrosion and verdigris accumulation to a minimum.
- Your recommending this up-to-date fixture means satisfied clients.
- Types for all Standard bowls.

—Catalog on request. Ask your plumber or plumbing fixture jobber or *Seat Dept.* of the makers.

MADE BY
THE BRUNSWICK-BALKE-COLLENDER CO.
1020 S. WABASH AVE., CHICAGO



Every type of building presents a different elevator problem. The accumulated engineering experience of this organization enables it to meet the conditions in the finer buildings of every type.

SEND FOR PHOTOGRAPHS OF K & H
INSTALLATIONS IN ANY TYPE OF BUILDING

KAESTNER & HECHT Co.
ELECTRIC ELEVATOR BUILDERS
500 SOUTH THROOP STREET
CHICAGO

There must be no "Weakest Spot"

When a chain—or a paint film—gives way in just one place, the result is disaster.

Tiny breaks, here and there, in the coat of paint on a building mean that it must be repainted, or there will be a gradual disintegration of the whole surface, and decay beneath the surface.

Trust to "Lead and Oil"

Then let the paint you use be Dutch Boy White-Lead and pure linseed oil—an armor invulnerable at every point.

This paint is waterproof. It contracts and expands with the wood into whose pores it fastens, and will not crack or scale.

The economy of Dutch Boy

Paint is only a small part of the cost of painting. Labor is the big item. And it costs no more to apply good paint than poor paint.

Dutch Boy White-Lead paint costs less, figured by the gallon, square yard or years of service. As it is mixed to order, you can have the exact color you want.

Harmony and individuality are shown in the portfolio of color suggestions for home decoration, which we will be glad to send you for ten cents.

NATIONAL LEAD COMPANY

New York
Buffalo
San Francisco

Cleveland
Cincinnati
St. Louis

Boston
Chicago

JOHN T. LEWIS & BROS. CO., Philadelphia
NATIONAL LEAD & OIL CO., Pittsburgh

Dutch Boy White-Lead

Save the surface and you save all

White Lead saves the surface

